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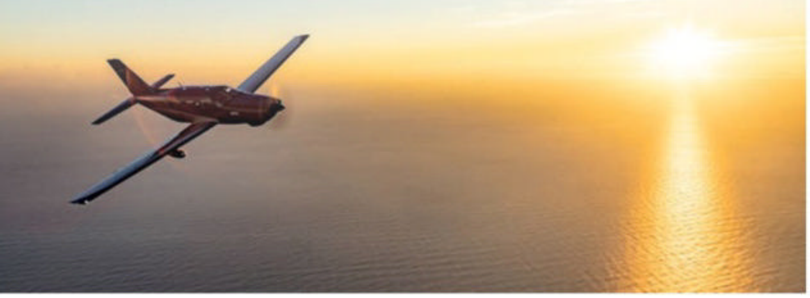
Piper's six-seat pressurised offering, the M350, provides owners with a chance to get above the flight levels without the extra cost of running a turbine. **Paul Southwick** hitched a ride to Brisbane, which gave him plenty of time to explore this very capable airframe.



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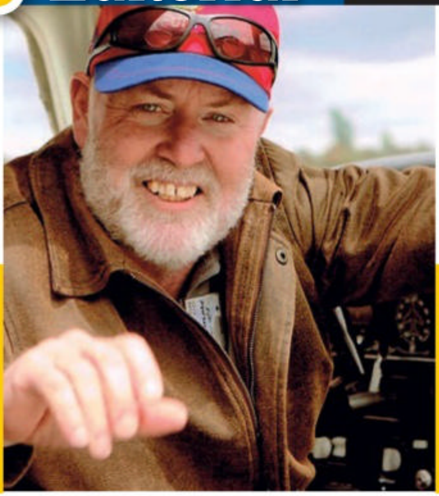

Too many students are canceling flying lessons when the weather looks too bad to fly. They could be passing up fantastic opportunities that may be the difference between being a pilot and being an aviator.

Aviators verses Pilots

I was out at a flying school a few weeks ago, and I could only describe the place as dreary. That's fair considering the viz was less than 3 nm and the cloud base was scraping across the radio antenna.

Dreary is a good description of the weather, but it was not out of place when applied to inside the flying school as well,

Nothing was happening. Some vague mumbling came from behind closed briefing rooms doors, but other than that the loudest sound was that of the photocopier.

"Where are all the students?" I asked the somewhat idle young lady behind the counter. She stared out the window as if to wonder what planet I had come from, and told me they'd all canceled because of the weather.

And that took me straight back to Jim Davis' new Right Seat Rules column in this issue (p42), and the comment, "Most of the talking should be done on the ground. In the air, a good instructor will remind, not teach."

My own ab initio instructors were great demonstrators of this. They had a rule that I couldn't cancel any lesson they had booked regardless of the weather. My drive from home to the airport was a clean 100 km each way, and if I had a booking, I made the trip even if there was rainwater streaming down the windscreen and the viz was so bad I couldn't see more than three white lines ahead of me.

I would get there knowing I wasn't flying, but there was still aviating to do. When you're doing your ab initio, aviating is far more than just getting your bum in the air, aviating is learning through immersion. It's sitting in the cockpit running TMPFISCH, it's doing a pre-flight even though you know you're going nowhere, it's reading magazines, it's studying your BAK, it's standing around drinking coffee with a CPL who's just come back from a long ferry flight.

It's grabbing an instructor and asking for a brief, or a check-up on your progress.

All of this is learning. It's adding to your knowledge base at a pace that simply doing the flying lessons can't match. Just learning the CASA syllabus and passing your test will make you a pilot. It's all the other stuff that makes you an aviator.

Do you want to be a pilot or an aviator? The US Navy has no pilots despite all those aeroplanes and aircraft carriers. They have aviators. They reckon their aeroplane drivers are a cut above pilots, so they call them aviators.

Anyone can be a cut above the average pilot, they just have to be prepared to work hard at it, and working hard means immersing yourself in aviation and not canceling your lessons just because the sky looks a little bleak.

> « aviating is far more than just getting your bum in the air »

Don't see bad weather, see an opportunity to pick the brains of instructors that are just as ground-bound as you are. See an opportunity to do some more talking on the ground rather than in the air when it's costing you money and comprehension is much more difficult.

Fill in the bits that make you an aviator and not just a pilot, and do it even when flying is off the agenda.

May your gauges always be in the green,

Mitch

Steve Hitchen – Editor

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News

WHITE PAPER PG 8

ROTAX 916 PG 10

Aviation White Paper: the Process begins

The ALP federal government has started the aviation white paper process, which it says will provide a strong future for aviation in Australia. ***Steve Hitchen*** *explores what that means.*

It was the election promise that not everyone wanted.

The Australian Labor Party made a new aviation white paper a part of its platform for the 2022 election, but for many advocates in Australia's aviation community it simply brought back the trauma of the last white paper published in 2009.

That document is held in the highest esteem by the current ALP government, but the aviation community still derides it as one of the worst papers on aviation ever published. For some, it amounted to nothing more than a statement of the status quo, presented no new initiatives and ignored most of the feedback upon which the preceding green paper was based.

Current Prime Minister Anthony Albanese, in his role of Minister for Transport and Infrastructure, was the major proponent of the 2009 white paper, and has since been its key champion, even during the years the ALP was in opposition.

In February, the process of creating a new white paper began with Minister for Infrastructure, Transport, Regional Development and Local Government Catherine King releasing the Terms of Reference (ToRs) for public comment, an unusual step that confused the industry because it was a first, and many thought it was a call for contributions to the aviation green paper.

The announcement was accompanied by a timeline that showed a green paper due in the middle of this year and the final white paper to be delivered in the first half of 2024. By that time, the process is expected to have chewed through $7 million of taxpayer funds.

All of this adds up to fears that the 2024 white paper will be nothing more than a case of horrible history repeating itself. Despite that, aviation advocates around Australia are preparing to go to the well yet again.

> « aviation advocates around Australia are preparing to go to the well yet again »

"This is the right time to review the aviation policy and regulatory settings as the sector begins the slow recovery from the impacts of the pandemic," said Australian Airports Association Chief Executive James Goodwin.

"It is over a decade since the last significant aviation policy statement by the Australian Government in 2009, when the current Prime Minister was the Minister for Infrastructure and Transport.

"It is hoped the aviation white paper will bring some long-term certainty to the sector and provides an opportunity to get the right settings in place for the decades ahead.

"It is vital the white paper also reviews government settings and government agencies which impact or control aviation infrastructure, planning, airspace management and safety."

Nat Nagy, CEO of the Aerial Application Association of Australia said the white paper was a "positive step" towards getting the policy settings right.

"It is important that the white paper examines and supports the critical role aviation plays in supporting emergency management and agriculture," Nagy said.

"We are pleased to see that the terms of reference include looking at how to support and regenerate Australia's general aviation sector.

"As we have seen in the floods and fires of recent years, both our aerial applicators and those in the broader general aviation sector have played a critical role in keeping our nation safe and prosperous.

"It is vital that the white paper considers the challenges faced by the broad range of both passenger and aerial work operators across the country to ensure we get the settings right across all areas of the industry and government."

The ToRs themselves attracted some criticism from Regional Aviation Association of Australia (RAAA) CEO Steve Campbell, who pointed out that the ToRs didn't acknowledge the current burdens placed on the industry, and called for more understanding from the Federal Government.

"The RAAA recognises the importance of a forward-looking white

BOSE A30 PG 10
ENGINEER LICENCES PG 12
WINGS OVER ILLAWARRA PG 14

General aviation will once more be under scrutiny as part of the Federal Government's white paper process.

paper," Campbell said in a submission, "however, we are concerned that the focus as set out in the Purpose section does not articulate clearly the need to overcome current burdens on the industry.

"There is a need to understand where the industry is at today before you can assume what it will be tomorrow.

"The RAAA would like to see a statement that will ensure, through this process, that a snapshot of the health of the industry is undertaken to better understand what levers can be used to bridge the gap to what will be required in the years ahead."

Substantial criticism of the white paper process stems from a belief within the aviation community that the ALP government already has all the information it needs to form policy from the previous government's Aviation Recovery Framework, published in December

According to the RAAA, much of what the white paper seeks to understand is already available through the previous government's policy for the recovery of the aviation sector published in December 2021.

"Whilst this is obviously an important metric to understand, work on understanding this 'role' of aviation has already been undertaken in the previous government's paper on *The Future of Australia's Aviation Sector – Flying to Recovery in 2021*.

"So the need for further deep dives into understanding the value of the aviation industry seems unnecessary and could possibly lead to distraction from the main value of the white paper in addressing policy issues the industry are facing now and into the future."

Minister King has laid out the Federal Government's position in the Short Final column of this issue of *Australian Flying* on p74.

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3 CASA issues Recommendations on Unleaded Avgas
4 Aviation flying high on Avalon Results
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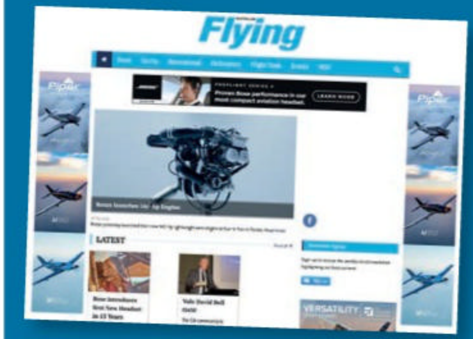

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Rotax launches 160-hp Engine

New engine to boost short-field performance.

Rotax's new 916 160-hp engine.

BRP-ROTAX

Rotax launched their new 160-hp lightweight aero engine at Sun 'n' Fun in Florida in March.

Weighing only 86 kg, the turbo-charged Rotax 916iS/c is designed for four-seat aircraft and produces 160-hp at 5800 RPM and 137 hp at maximum continuous power of 5500 RPM.

For comparison, a 160-hp Lycoming O-320 weighs in around 125 kg, leading Rotax to describe the 916 as "the impossible engine".

"The launch of the 916iS/c is yet another testament to our commitment to developing ground-breaking technologies and creating the most advanced propulsion systems for our customers," said Peter Ölsinger, General Manager, BRP-Rotax, and Vice-President, Sales, Marketing & Communications, Rotax Propulsion Systems.

"For us, it was crystal clear that we had to build on the success of the 915 engine. We can now seize new opportunities in the four-seat market segment with a perfectly mature product and thus continue our steady growth of recent years.

"With the 916iS/c, we are responding to unmet customer needs and living up to the innovation philosophy of our long-standing company,"

Rotax believes the new engine will improve short-field performance and permit steeper descents, and debuted the engine in Lakeland in a CubCrafters Carbon Cub UL.

"CubCrafters and Rotax share a dedication to drive great performance through new technology innovations," said Patrick Horgan, President and CEO of CubCrafters Inc.

"Working together to develop the new Rotax 916iS/c powered Carbon Cub has been a great collaboration. We are excited to launch our latest products together and to make them available worldwide.

“The powerful and smooth single-lever operation of the Rotax 916iS/c is outstanding, bringing the latest engine technology to the Carbon Cub Family."

The 916 engine has a TBO of 2000 hours and also has a 24-volt option available.

Bose releases A30 Headset

New headset the first new Bose model in 13 years.

The new Bose A30 noise-canceling headset

BOSE

Bose introduced the A30 aviation headset in March, the first new model to come from the US manufacturer since the top-of-the-line A20 nearly 13 years ago.

The A30 is a completely new noise-canceling headset that the company says is the result of research and gathering pilot input.

“When we asked pilots what improvement was most important to them, their overwhelming response was comfort,” said Matt Ruwe, senior product manager for Bose. “We took that seriously and developed a new balance in the A30 with noticeably more comfort while maintaining and enhancing headset performance.

"The changes amplify the experience for our core A20 users while appealing to a broader range of pilots.”

Whilst admitting superceding the A20 was "no mean feat" Bose has made several changes that set the A30 apart from it's predecessor, including:

- a 20% reduction in clamping force
- mic and cable that can be easily swapped between ear cups without tools
- high, medium and low modes of noise canceling
- better audio and noise reduction compared to the A20
- greater durability
- TSO C139a certification.

“The A30 is a combination of what we know works incredibly well with A20 as well as what customers have asked for in a new headset,” said Ruwe.

“In addition, we considered how this headset could meet customers’ needs well into the future.”

The Bose A30 is expected to retail for $A1969.95

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CASA introduces Modular Part 66 Licences

Feedback shows support for LAME licences with systems exclusions.

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Modular licences will mean that engineers can work on basic aircraft having not studied advanced systems such as pressurisation.

The Civil Aviation Safety Authority (CASA) said in March that it would introduce modular LAME licences based on exclusions after industry feedback to a discussion paper showed significant support for the concept.

Modular licencing would permit engineers to be licenced under CASR Part 66 without having to study a wide range of aircraft systems that may not be required for their intended careers.

It is thought that modular licences would get more engineers qualified to work on basic aircraft sooner, helping relieve ongoing engineer shortages in the industry.

Of the 60 submissions to the discussion paper (DP), 90% supported the idea either wholly or with some changes.

"Consistent with the feedback from industry and the [Technical Working Group], CASA will seek to expedite the delivery of the core beneficial outcomes of this proposal," CASA said.

"To achieve this, CASA will develop a legislative proposal that will facilitate modular licensing outcomes using exclusions. This approach will also provide more flexible pathways in other cases, including Australian trainees, that cannot access certain systems to gain practical experience, as well as recognition of foreign licences and defence authorisations.

"In order to expedite these outcomes, the status quo will be maintained on some requirements, such as minimum experience requirements and propeller exclusions. These requirements will be considered in more detail in later phases of this initiative after the core outcomes are achieved."

Exclusions were designed to help engineers move between CAR 31 and Part 66 licences. They have the potential to be used to facilitate licensing, particularly in cases where an applicant can't achieve the necessary experience in particular systems, as is common in regional areas.

CASA also believes that exclusions may help with accepting foreign engineer qualifications.

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AMDA takes over Wings over Illawarra

Airshows Downunder brand to be revived as WOI goes bi-annual.

Handing over: AMDA Foundation CEO Justin Giddings with WOI organiser Mark Bright at Avalon 2023.

AMDA Foundation announced at Avalon 2023 that it has taken over Wings Over Illawarra (WOI) and would re-brand the event as Airshows Downunder Shellharbour.

WOI has been run for several years at Albion Park under the guidance of organiser Mark Bright, who has built the show up from a simple fly-in to a major event.

The annual event will now be run every two years, with the next one now scheduled for 1-3 March 2024, and will continue to be held in non-Avalon years.

AMDA Foundation CEO Justin Giddings said the move was inline with his organisation's mission to promote the Australian aviation industry.

"Wings Over Illawarra has built an excellent reputation as an event for the general aviation and light sport community in Australia," he said.

"It has an exciting airshow covering the breadth of vintage, warbird and modern aviation and a highly regarded careers and skills day to help attract the next generation. It also provides an important means of promoting general aviation to the general public."

WOI organiser Mark Bright said that he felt that AMDA Foundation's resources and expertise would enable WOI to achieve his original vision for the event.

"Wings Over Illawarra was created to give the general public a great air show and help promote affordable recreational aviation in Australia," he said.

"AMDA Foundation's great experience and resources will take the air show to the next level. Their experience in operating major events such as the Australian International Airshow will help [WOI] grow and increase its ability to promote aviation in Australia."

The Airshows Downunder brand was used in the early days of the Australian International Airshow and several other air shows in regional Australia. The new branding combined with the Shellharbour name cements Albion Park as the home of the air show for years to come.

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PHILIP HOSKING

Back with a Bang

Avalon 2023 was hailed as one of the best Australian International Airshows ever held. **Tony Self** looks back on what made it so good.

There remains not a skerrick of doubt that there is a huge appetite for major airshows in Australia. After being postponed for two years, Avalon International Airshow 2023 was a sold out event, although that popularity exposed a few holes in the logistics of bringing the huge crowds in and getting them home again.

A seemingly endless caravan of families, prams, trolleys and individuals streamed in through the gates from the moment they opened until the day's show was three quarters over. Long queues formed not only for food and drink, but for the experience of walking through a USAF C-5 Galaxy, or going through a vendor's exhibit, or collecting a RAAF aircraft pin.

Airshow organisers AMDA recorded 248,000 trade and public attendances across the entire six days of the event, with

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PHILIP HOSKING

MAIN IMAGE: Lighting up the night: the RAAF Roulettes head towards the crowd during their dusk display sequence.

ABOVE: General aviation was given its own space to the south of the exhibition halls.

LEFT: Global Aviation Products showcased Sling Aircraft to what they said was one of the best Avalon air shows ever.

the Saturday and Sunday crowd reaching the 80,000 daily capacity. Flying in was not an option in 2023 as the Avalon East satellite strip was not operating (although some did fly in to Lethbridge and bussed from there).

Trade days

The trade days were conspicuously busier than previous shows, and the 794 participating organisations could easily have been joined by hundreds more had the exhibition space not been sold out. One of the noticeable differences in 2023 was the number of UAS (uncrewed aerial systems or "drones") and AAM (advanced air mobility) companies and products on display.

Avalon is not just about flying and vendor displays; there was a four day specialist conference program, and the Innovation Awards and PitchFest. PitchFest allows Australian companies and researchers to pitch their new ideas and technologies to the Australian and international community.

Flying stuff

To a certain extent, Avalon Airshow is the same event repeated every two (or four!) years. Limited displays on the trade days led up to the Friday afternoon show, which started at 1.00 pm and finished in the dark well after 9.00 pm. The flying displays in 2023 were very similar to 2019: F-35, MH-60R Seahawk, F-22, Kawasaki C-2, Roulettes, C-17, Skycats wing-walkers, Paul Bennet and his Sky Aces Pitts Specials, and the RAAF showcase of P-8 Poseidon, F/A-18, KC-30, Hercules, and E-7 Wedgetail.

Bob Carlton's jet-powered Super Salto sailplane from the US provided day and (Friday) night pyro-technic displays. High-performance aerobatic monoplanes were displayed by Matt Hall and Emma McDonald (MXS-R and Extra 300L), Mark Jefferies (Extra NG) and Glenn Graham (Edge 540).

But the show-stoppers—and arguably worth the admission price alone—were the Republic of Korea Black Eagles.

This team of eight immaculately-presented KAI T-50B Golden Eagle supersonic trainers stunned the crowd with flawless, extremely difficult and complex displays of teamwork, skill and artistry. The Black Eagles are generally acknowledged as the world's best military formation team, and the performance envelope of their T-50B jets makes it possible

JOHN ABSOLON

"the performance envelope of their T-50B jets makes it possible to complete manoeuvres that haven't been seen before."

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TOP TO BOTTOM:

Without doubt, the ROKAF Black Eagles flying South Korean T-50s were the stars of the show.

An RAAF F-35 pops a flare as it climbs out during an energetic display.

Skippy Formation: a Qantas A330 makes a pass with two 1 SQN RAAF Super Hornets for company.

to complete manoeuvres that haven't been seen before.

The "tornado break" in particular has to be one of the most spectacularly beautiful ways of returning a formation to the circuit.

Warbird enthusiasts were a little disappointed with the only contributors being RAAF's 100 Squadron, which launched most of their displays from nearby Point Cook, rather than having their collection on site.

Statics

The static display area was considerably expanded over previous shows through the creation of the general aviation and airsport precinct at the southern end of the airfield. An additional public entrance from the carparks led into the precinct, but the pedestrian traffic seemed to just pass through on the way to the noise-makers at the northern end.

The precinct was a long way from the display line, and only the die-hard enthusiasts found their way to the scores of displays by flying clubs, aircraft associations, historical societies, gliding, trike and rotorcraft groups, and service organisations.

Elsewhere on the field, helicopter manufacturers including Guimbal, Airbus, Leonardo and Robinson had a good range of hardware on display. Uncrewed and AAM aircraft, such as the Pegasus flying car, the Swoop Aero Kite, the Vertiia eVTOL, and the XSun SolarXOne, had strong presences.

The big names of corporate and general aviation (Dassault, Gulfstream, Textron and Embraer) had good profiles.

Also ondisplay was the first certified electric aircraft in Australia, the Pipistrel Alpha Electro, which travelled from Perth with FlyOnE. It is becoming apparent that the composition of the exhibitors is now out of sync with the flying display, as the GA component of the flying was limited to aerobatics and wing-walking.

It would have been good to have seen an electric aircraft showing

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TOP TO BOTTOM: Smoke on: Reigning World Air Race Champion Matt Hall streaks in from stage right.

100 SQN RAAF flew two antique trainers in formation.

Mike Smith's Chaika L65 Sea Bear arrives to take its place on the Seaplane Pilots Association of Australia stand in the GA zone.

A USAF C-5 took up a huge part of the apron, but provided welcome shade.

its capabilities, and perhaps some of the new generation of GA, RA and LSA aircraft such as the Tecnam P2012 Traveller, Diamond DA62, VL3 Evolution, Sling 4 TSi High Wing, TL3000 Sirius and Dynamic WT9.

Exhibitionists

During the three and a half trade days at Avalon 2023, the three large exhibition halls were packed with people: men and women in uniform, suits, and corporate wear, amongst them diplomats, politicians, and military leaders.

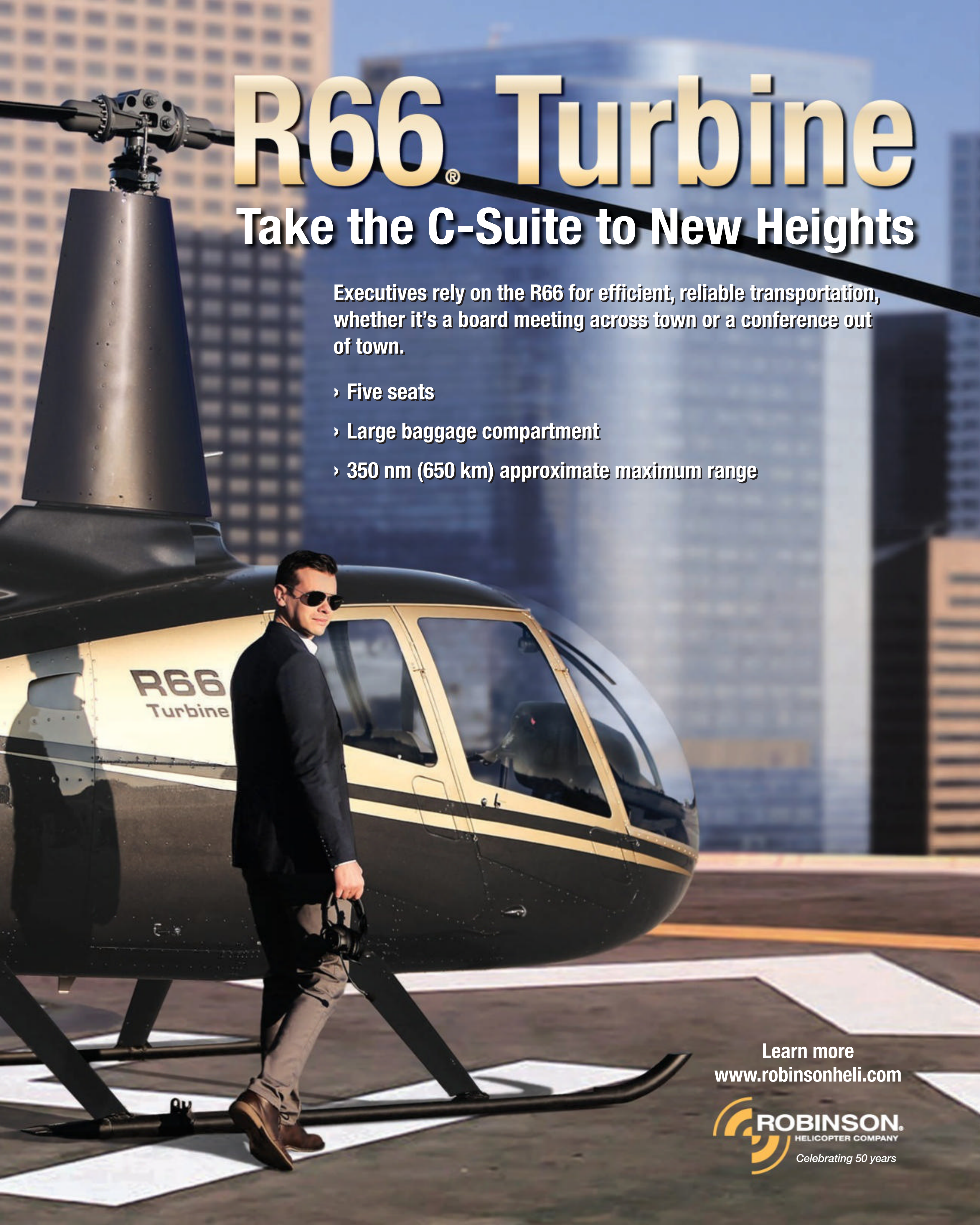
The air show's full title is "Australian International Airshow and Aerospace and Defence Exposition, and the flying display is not the core business. The organisers describe the event as giving "industry, government and academia a platform for engagement via a premium industry exhibition, static aircraft display and corporate hospitality".

The largest participants are the big military and defence organisations such as Boeing, BAE Systems, Northrop Grumman, and Lockheed Martin. Local defence and aviation industry is also represented comprehensively. But when the trade days give way to public days, most defence exhibitors abandon their very expensive stands and leave the halls feeling empty.

A show to remember

The previous Avalon was remembered for the heat, but in 2023, the weather was far kinder. Nonetheless, strong winds, tonnes of dust, overnight rain and a lot of sun created challenges. An afternoon storm on the final day held off long enough to allow the program to be completed.

The 2023 event will likely be remembered for the vast numbers of spectators, the dedication of the volunteers on whose backs the show is carried, the monumental traffic jams, and the business success of what is now one of Victoria's biggest international events.



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Comfort in Cruising

Piper's M350 carries on the legacy of the Matrix and Malibu with a very capable six-seat platform that transports passengers and crew in luxury up in the flight levels. **Paul Southwick** hitched a ride on one going from Essendon to Archerfield.

Piper's M350 carries on the tradition of the PA-46 range.

Many a pilot aspires to own an aircraft with more power, speed, and room; one that sports a pressurised cabin, enabling above the weather, flight-level travel. The Piper PA-46 M350 promises all that.

Nick Jones, from Airflite, the Piper authorised dealer in Australia, offered me an M350 flight. It would be a 748-nm, non-stop, IFR trip from Moorabbin to Archerfield. The immaculate red and white 2016 example (registration withheld at the request of the owner), was one I'd admired from afar for years. Having previously flown the more expensive M600 turbine version of the same design, the performance of the six-cylinder, fuel injected, turbo-charged Lycoming TIO-540 version would be interesting.

My guide was international ferry pilot, Stuart Caling, who was to fly the aircraft onwards to the USA.

Background

The PA-46 first flight was in 1979 with a 310-hp engine; FAA certification and deliveries occurred in 1983. The more powerful M350, with a new wing, commenced production in 1988 and was released in 1989. It is a cabin-class, six seat, low-wing of metal construction with retractable landing gear. A pressurised aircraft with a maximum cruise speed of 213 KTAS, its maximum range is 1343 nm, and its maximum approved cruise altitude is FL250.

At this altitude, the automatic pressurisation system can maintain a comfortable cabin altitude of just 8000 feet.

Fuel capacity is 454 litres, in two wing tanks, and the engine drives a Hartzell three-blade composite, constant speed propeller. Standard avionics are Garmin G1000 NXi, with GFC 700 integrated autopilot. There is a long list of desirable options. Our test aircraft was fitted with speed brakes.

In other words, it's an impressive aeroplane .

Walking around

The M350 sits high, with wide main gear track of (3.7 m). Exterior surfaces are primed with polyurethane to keep the finish attractive. It works. Our 400-hour aircraft still looked new. It had been proudly maintained all its life.

With the cowling off, it was possible to inspect the tightly packed engine. The size is impressive, quite a bit bigger than the more popular smaller general aviation aircraft. It certainly looked like it could generate a lot of power, but with the tight fit for minimum frontal area, engine management would be important.

The M350 has a long wingspan, and the test aeroplane had a radar dome slung beneath the right wing. Those extended wings mean room for long, cable-operated ailerons, for great roll control, and huge electrically-actuated flaps for landing.

The huge, Hartzell all-metal, 2.02-m diameter, "fat" propeller, really grabs attention. For IFR flights there are de-ice boots on the tail and wing leading edges, and lots of static discharge wicks. The LED landing and position lights mean no issues with bulb burn-out.

There is a large area behind the back seats for 45 kg of baggage. Outside there is a forward baggage locker with the same capacity, and a few other hidden little storage pockets, for example, in the radar pod, and another on the left, just before the tail.

Once ensconced in the left-hand seat, pilots are greeted with the familiar and welcoming sight

PIPER AIRCRAFT

> **"It's a professional cockpit that gives you a hint about the way in which the M350 must be flown."**

ABOVE: Long, slender wings characterise the PA-46 airframe.

LEFT: Entry is via a clam-shell door with built-in airstairs.

of a three-screen G1000 panel, a common standard fit in many high-performance aircraft. The larger centre screen can display checklists, engine, and weight and balance calculations.

On the left side, was a large, fully-independent Aspen Avionics Evolution backup unit. The latest M350 models have the Garmin 275 unit and G1000 NXi avionics.

It is evident that you are in a next-step-up, high-performance aircraft, by the number of knobs and buttons. There are multiple overhead switches to numerous to explain, climate control, speed brakes, autopilot controls, blue wings-level button, stall test, display back-up, electric trim, cabin pressure dump, gear lever, emergency gear extension, anti-ice ... it goes on.

The gear can be lowered at a usefully high 165 knots, and the first stage of flap is available at the same speed, but only one stage at a time, 20° flap has a 130-knot limit, and 36° (full), 116 knots.

In front of the pilot there is a built-in, pulse oximeter. To use it you simply slip your forefinger inside. Within a few seconds your pulse rate and oxygen saturation levels (ideally over 90%) are displayed on the centre screen.

There is also a flight management system (FMS) alpha-numeric input pad.

It's a professional cockpit that gives you a hint about the way in which the M350 must be flown.

There's a most generous-sized pocket on the left of the pilot, with plenty of room for iPad, camera, iPhone, charts and other accoutrements. Likewise, the armrests on each seat that can be pulled down after take-off make cruise more comfortable. The handle on the pillar in the centre of the windscreen was useful for getting in and out, and the dash overhangs the instrument panel just enough to ensure the instruments remain easy to read in strong sunlight.

Out back

In the back it's pure luxury, starting with easy access, gas strut supported air stairs; leather seats, foldaway worktable, ample leg room between the front and rear facing rows of seats, cup holders; USB points, overhead lighting, and three large windows per side. There is no possibility of claustrophobia here, quite the opposite.

When combined with the pressurised, air conditioned environment, the attraction of the M350 to families or businesspeople becomes obvious. All without needing to stump up for a turbine engine. The M350 stands alone as the only single-engine, piston powered, pressurised aircraft still in production.

Flying it

Run ups were conventional and showed everything was in order. We then conducted a take-off brief. I was to rotate at 80-85 knots and climb out at 90-95 after raising gear and flaps. We would make a right turn to intercept the course to Melbourne, with a frequency change to Melbourne Departures passing 2500 feet, on the way to an initially cleared altitude of 8000 feet.

Flying lots of different aircraft is an acquired skill and carries risks. Design and position of the rudder pedals is one example. The M350's

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CREDIT

LEFT: The Hartzell three-blade prop is plenty enough to convert power into performance.

BOTTOM LEFT: The M350 presents a business-class ride in the cabin in terms of space, comfort and luxury.

PIPER AIRCRAFT

Specifications

Wingspan	13.11 m
Length	8.8 m
Empty Weight	1383 kg
Max Takeoff Weight	1969 kg
Usable Fuel Capacity	454 l
Max Cruising Speed	213 KTAS
Certified Ceiling	25,000 feet
Maximum Range	1343 nm
Take-off Distance to 50ft	637 m
Landing Roll	600 m
Seats	6
Engine	Lycoming TIO-540-AE2A
Engine power	350 hp

are robust, with a strong steel spring loaded rod holding them in place. I initially had trouble turning and braking because I could not see that my left foot was on the rod, not the pedal itself. I decided that for every new aircraft flown in the future it would be wise to first take time to have a close look at them.

I taxied out for Runway 17R, conscious that we were at MAUW, and applied the power. I instantly appreciated that big thick propeller. The acceleration was brisk indeed. Initial power was 30 inches, and then, once the RPM caught up, I went to full power. The M350 climbed away very smoothly and powerfully. I raised the gear and then the flaps, before settling into a 95-knot climb while holding runway heading to 500 feet AGL. I then turned west over Port Phillip Bay and its beaches.

After changing to Melbourne Departures, we were given a northerly vector and climb to FL130. We were later cleared to climb to FL230, changing the barometric pressure to 1013 as we passed 10,000 feet. It was a perfect, clear, sunny day for flying and although we turned on and checked the weather radar, it would not be needed for this flight. What a wonderful asset though for typical winter or thunderstorm conditions in Australia.

Happy with how well the M350 flew manually it was time to put on the autopilot, using flight level change (FLC) to take us to the flight levels at 125 knots. By now Caling had reduced the manifold pressure to 35" and RPM to 2500. Recommended fuel flow at that setting is 32 gph. This gives an economical cruise climb that does not overstress the engine. We were looking to keep the cylinder head temperatures below 380° F. To do that, the large centre flight display was perfect, as all engine and system indications could be displayed, and easily read, in one place.

This careful engine management was to be a key element of our flight. Professionally flying the M350 and looking after the engine is essential for performance, economy, and engine life. And if you are about to fly a single engine aircraft all the way across the Pacific to the USA, such matters are critical.

The climb over Melbourne CBD and Melbourne International was scenic. We quickly leveled off at FL130. We didn't need to don oxygen masks or cannulas, as the automatic pressurisation system, together with the air conditioning, had us comfortable indeed.

Caling tried different configurations of power, fuel flow, and propeller, and noted the results, before we climbed up to FL230, and repeated the exercise.

We were to experience a tail wind of up to 50 knots – one of the advantages of being able to choose a higher altitude. At flight levels you are usually above the weather, in a space where there are very few light aircraft, and well below the

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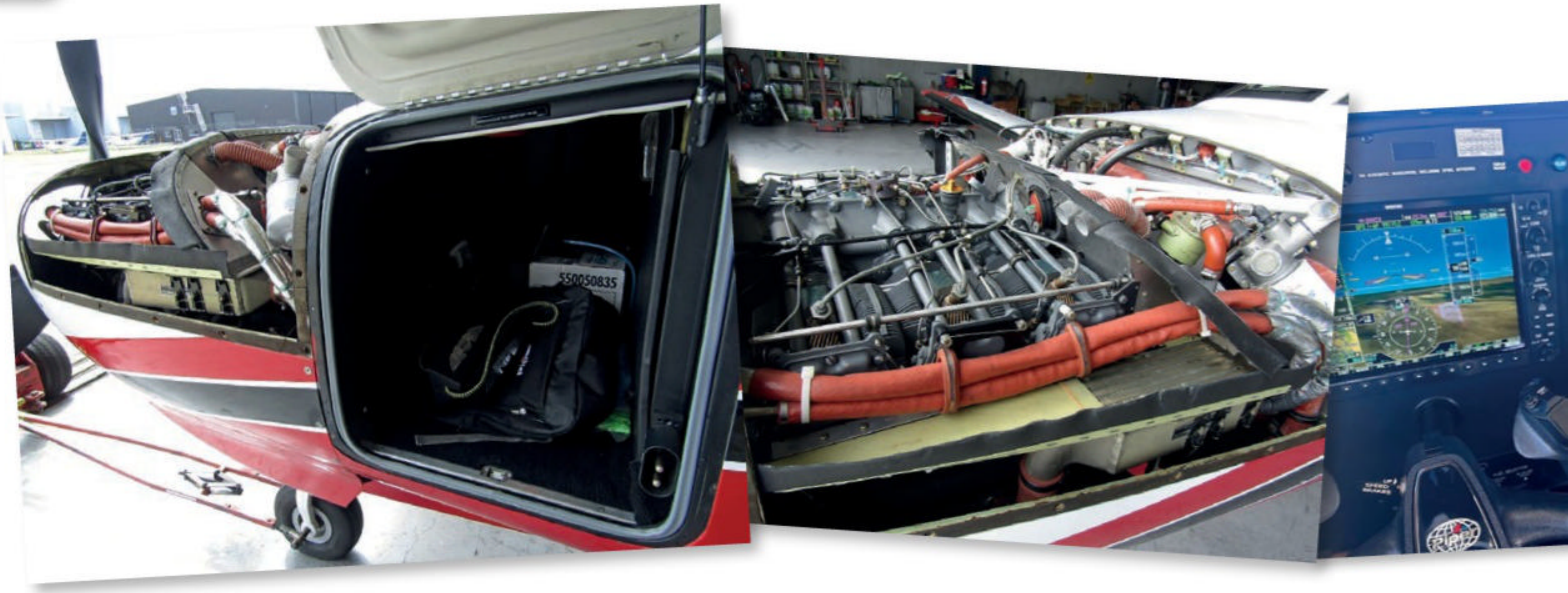

airliners. The TAS in cruise was 188 knots and ground speed 240 knots, yielding a flight time of just 3 hour 38 minutes. That's way ahead of what you could do on the airlines when typical check in and boarding times are included.

An approximation of cruise fuel flow in the M350 is 20 gph (75 lph). We used 78 gallons (295 l) for the flight, giving us two hours fuel remaining on landing. That says something about the long legs of the M350. Pulling the power back to 26.4 inches we achieved a TAS of 178 knots, and fuel consumption of just 15.6 gph (59 lph) at 2220 RPM.

Carling, who holds an ATPL and Grade One instructor rating, passed on lots of wisdom and techniques during the flight. He also asked lots of testing questions relevant to professional flying.

Turbulent arrival

The tall Gold Coast apartment buildings and twinkling surf soon came into sight to the East, and the skyscrapers of Brisbane appeared to the North. The radio waves were quiet, almost deserted for a busy training airport.

Normal descents involve leaving engine controls at cruise setting and increasing the speed to give the desired rate of descent. If a higher rate of descent is required power can be reduced to 20", while maintaining 1350° F turbine inlet temperature to avoid shock cooling.

We were kept at FL230 until relatively close to Archerfield. There are important control steps going into YBAF to keep you below the big jets approach path into Brisbane International. We requested lower, and being speed-brake equipped, I deployed them to aid descent. The small, but highly effective, bright red speed brakes, deploy or retract near instantly with a quick flick of the switch on the control column. They greatly increase the rate of descent, without rapidly cooling the engine. The pilot operating handbook (POH) does not impose any speed restriction on their use. This meant we could easily duck under some clouds and get visual with the field.

Caling canceled IFR and we proceeded VFR. It was a clear, sunny day, and our approach was via the Park Ridge Water Tower reporting point. After the call, the tower controller, who recognised Caling's voice immediately, gave us the option

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LEFT TO RIGHT:

The front baggage compartment can carry 46 kg of bags.

Under the cowl is a TIO-540 that puts out 350 hp.

Garmin avionics in the test aeroplane present a professional face to the pilot.

of the grass Runway 04 or sealed Runway 10, with a gusting 20 knot cross wind.

While being happy with those conditions in a familiar aircraft, I decided it prudent to ask Caling to do the landing. After hand flying the visual descent, via some pretty rough turbulence, during which I reduced to design manoeuvring speed (133 knots at MAUW, down to 100 knots at lower weights); said "your aeroplane" and sat back to enjoy the approach. In turbulence, the M350 handled itself very well. It is a good stable platform, and those big ailerons helped with control.

Normal approaches are flown at 80-85 knots with full flaps, with power set as required to maintain the desired approach angle. Passing through 50 feet on very short final, it is recommended to reduce power to idle and make a normal landing, with braking as required.

Caling put it down in challenging weather, with his extensive ferry experience coming to the fore. His landing in the horrible conditions was so good he even received a compliment from the tower. That doesn't happen very often!

Target market

Piper's target for the M350 is ideally IFR qualified pilots who are stepping up and want to travel longer distances quite often, get there quickly and carry a few passengers in luxurious comfort, but without having to fork out for a much more expensive turboprop or be limited to the longer runways that the turbo-props or jets require.

My test flight was a round 750 nm, and proved that the M350 is ideally suited for the realities of business and pleasure travel throughout Australia. Often that will be over long distances, where known-icing capabilities (if fitted) to get through, or pressurisation to get above weather is important.

The ability for passengers and crew to stretch out in air-conditioned comfort, with protection from extremes of temperature can never be overstated.

Summing up

As aircraft reviewers we search for a perfect word or phrase that sums up an entire aeroplane. The M350 is a relatively rare thing in aviation, that is, an aircraft that delivers on all its promises, promises of more power, speed and comfort. At a reasonable price too.

With good professional training and operation, it is an aircraft that will be very popular with owners, both when they fly it, and as a stepping stone to that turbo-prop or jet.

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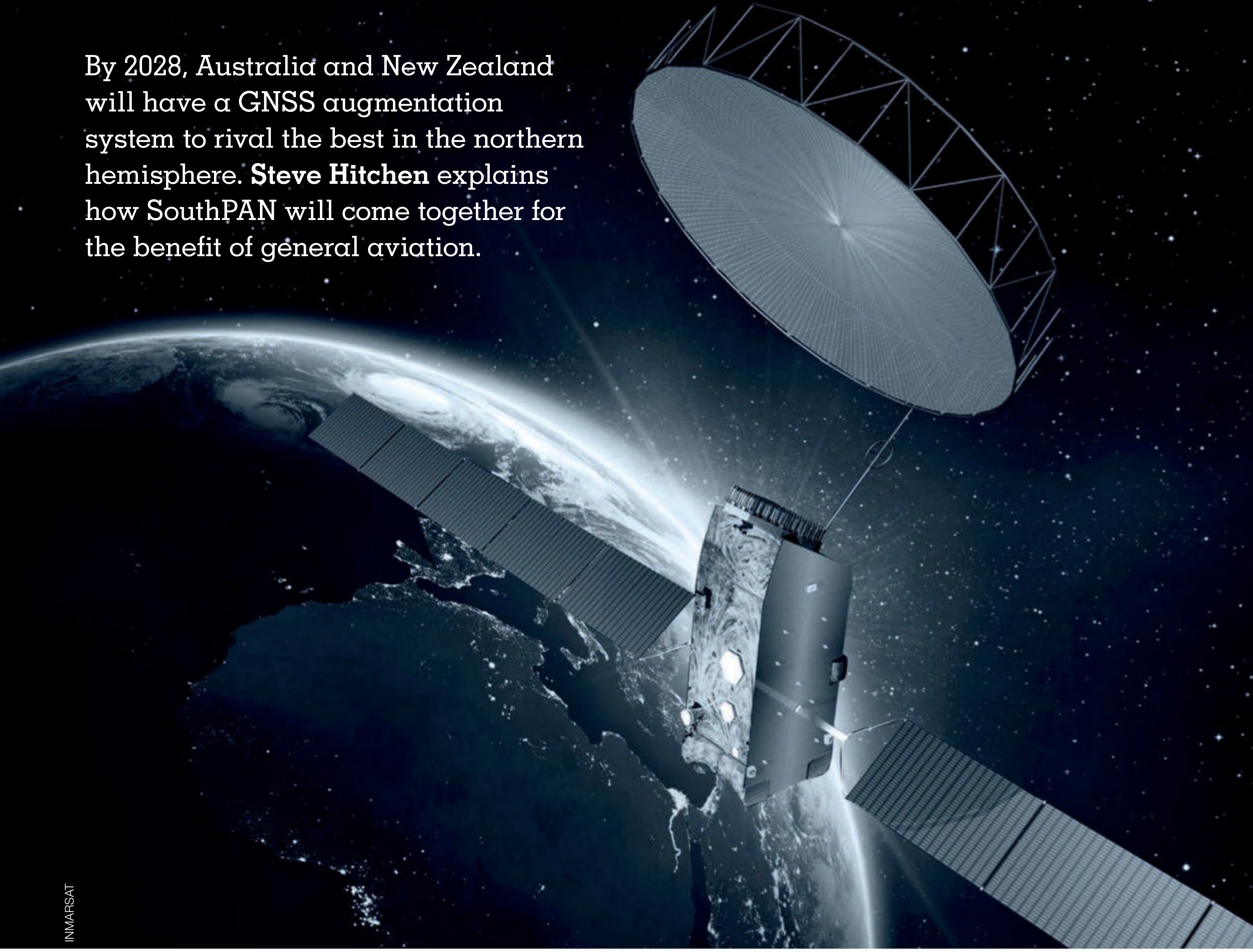
Building SouthPAN

By 2028, Australia and New Zealand will have a GNSS augmentation system to rival the best in the northern hemisphere. **Steve Hitchen** explains how SouthPAN will come together for the benefit of general aviation.



INMARSAT

GEOSCIENCE AUSTRALIA

MAIN IMAGE: The Inmarsat 4F1 satellite is being used to provide SouthPAN early Open Services (non SOL) until it is replaced with two new satellites.

ABOVE: Airservices and Geoscience Australia monitored the test results with equipment installed in the back of VH-LAB.

Europe and the USA have for several years now had the jump on Australia and New Zealand in terms of GNSS navigation accuracy. Our northern colleagues have the luxury of augmented signals that can pin-point a receiver more precisely and with greater integrity than the GNSS that is currently in place in Australasia. The generic term is Space-based Augmentation System – SBAS.

In Europe, they call it the European Geostationary Navigation Overlay Service (EGNOS); in the USA, it's Wide Area Augmentation System (WAAS). The existence of this technology has meant that IFR pilots can fly with greater navigation capability both lateral and vertical than is available in countries with no SBAS.

But now we're getting into the game, with the planned introduction of SouthPAN.

Announced in September last year, the Southern Position Augmentation Network (SouthPAN) is a collaboration between Geoscience Australia and Toitū Te Whenua Land Information New Zealand (LINZ) to build our own SBAS that will deliver similar capability to the time-tested EGNOS and WAAS.

Although designed for use by a number of industry sectors, SouthPAN will deliver for aviation by enabling IFR approaches down to 200 feet decision height with ILS-like capability at regional airports. We won't have that until 2028, but by 2030 we'll probably be wondering how we ever did without it.

Inside SBAS

SBAS is a system of space- and ground-based infrastructure that enhances the accuracy and precision of existing GPS and other global navigation satellite systems. Augmented signals can improve position accuracy from what was 5-10 m down to as little as 10 cm, although for aviation the best accuracy likely to be available is 3-4 m. All without internet coverage. Here's how it works.

SouthPAN will operate through a series of reference stations that will monitor the signal broadcast by GNSS satellites–such as GPS and Galileo–and compare the position signal that GNSS has given with the known location of the reference station and the position data of the satellites.

That GNSS information is then passed through a central correction processing facility. That checks what the GNSS is saying against the known location of the reference station and calculates the difference between the two.

The central processing facility calculates corrections for these errors and updates the status information about the GNSS signal. It passes that through to an uplink station, which transmits the data up to a satellite. That's a mid-earth-orbit geostationary satellite that takes those corrections and sends the augmented or corrected positioning information to the receiver.

The results are levels of integrity and position accuracy that non-SBAS receivers can only hope to aspire to.

But when we're talking about a position accuracy that is within the wingspan of the average general aviation aeroplane, you have to start to wonder what the Romans are going to do for us. In truth, when it comes to lateral navigation, SouthPAN will increase the integrity, (or trust that pilots can place in the navigation information), but not much in the way of new flight capabilities. The magic comes when you apply it to approaches with vertical navigation (APV).

APV is considered eight times safer than approaches with lateral navigation alone, but as you read this, the only technology that can deliver APV in Australia is Baro-VNAV; standard fit for airlines, but out of practical reach for smaller aircraft. GNSS alone doesn't meet the standards for APV because it simply has too many errors.

And that's where SBAS and SouthPAN come to the rescue.

> **“the system is confident it can place the receiver inside a circle that is less than one-third of the wingspan of a Cessna 172”**

Collaborative effort

Alison Rose is Chief of Geoscience Australia's Space Division, and *Australian Flying's* first port of call for expert advice on SouthPAN.

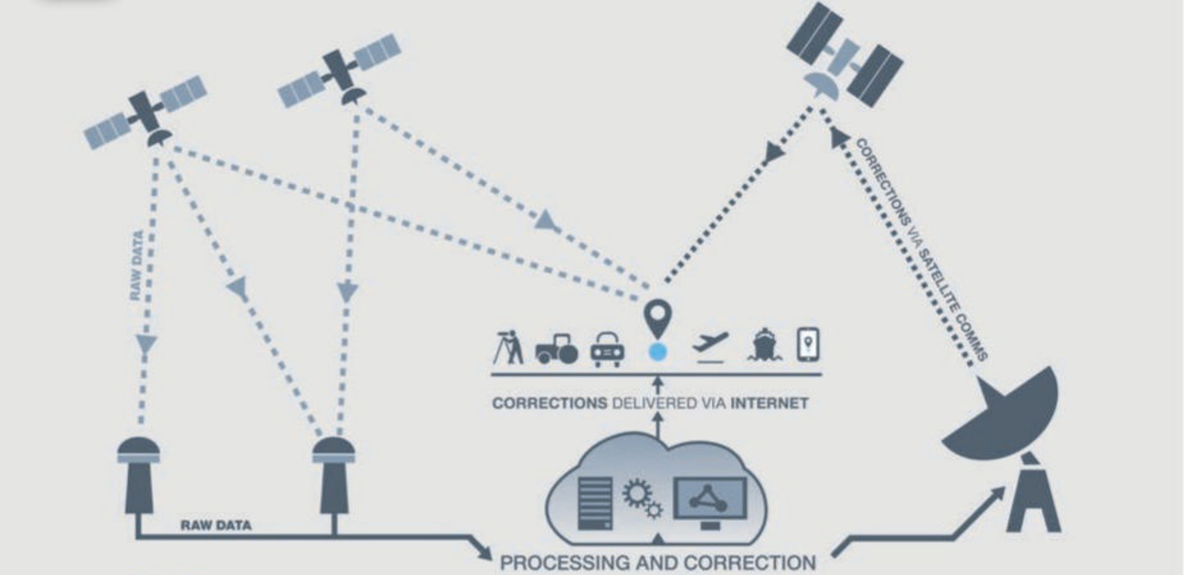
"SouthPAN provides a series of three services," she points out. "For the aviation community, the key service from 2028 will be the L1 SBAS service, which will provide a capability that is basically similar to the USA's WAAS and the European EGNOS. It will enable approaches to the runway with decision heights as low as 200 feet.

"The second service is Dual Frequency Multi Constellation (DFMC) SBAS. This is an evolution of SBAS technology, which will bring better performance. We see this as the likely future direction for aviation applications.

"The third service is the one that gets us down to as little as 10 cm, using a technique known as Precise Point Positioning [PPP]. This is not available for use under Instrument Flight Rules because it's not certified for safety-of-life (SOL) operations."

That's important to note: although SouthPAN is going to deliver accuracy about the length of a smart phone, it's never going to be available for aviation. PPP will not apply to us, but will be suitable for agriculture, construction, maritime and other sectors where operators don't regularly rely on positioning to keep themselves and others alive.

"The primary service that aviation will access is SouthPAN's L1 service," Rose stresses. "SouthPAN will support a variety of sectors, but aviation is obviously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TOP: SBAS will employ a series of ground stations to augment GNSS signals, providing greater integrity and precision.

ABOVE: Air Affairs Australia used King Air VH-LAB in SBAS trials.

a priority sector for us, given that we will be developing and delivering the L1 service SOL by 2028. Equally, maritime, road, rail construction, resources, utility and locations sectors will be able to access the service.

"Importantly, SouthPAN is the first Southern Hemisphere satellite-based augmentation service, and it will be in line with the services available in the Northern Hemisphere, so it's a very exciting project for that reason."

The coverage is going to be significant: mainland Australia and New Zealand extending outward to cover some of the remote territorial islands such as Auckland Island, Christmas Island, Chatham Islands, Lord Howe and Norfolk; although the remote-island airports will be capable of terminal and enroute navigation only, rather than APV. It's a large chunk of airspace, but Rose says navigational safety within the area will improve significantly.

"The large service area of SouthPAN will suit the needs of Australian aviation by providing good navigation performance in locations that may never have ILS," she points out. "That was demonstrated by our test bed, that it increases safety and the chance that flights will reach the intended destination.

"It will also reduce diversions due to weather or the unavailability of terrestrial navigation aids like VOR or ILS."

New infrastructure in terms of ground stations and satellites will be needed to deliver SBAS. The ground stations are high-integrity, hardened GNSS ground stations, because that's what is needed for SOL certification. They will be spaced very evenly across Australia and NZ: six in NZ and 23 in Australia–including in NZ and Australian Antarctic territories–and a further four in other foreign countries.

"We've already done a lot of scoping for locations," Rose says, "but we need to take into account many factors such as the visibility of the ground station, land access, serviceability; physical factors and technical factors in terms of GNSS visibility.

"We already have GNSS ground station infrastructure across Australia, which SouthPAN uses while we are putting in these additional SouthPAN stations."

The task of building the infrastructure has been entrusted to Lockheed Martin, who signed a contract with Geoscience Australia last year worth $1.2 billion.

Testing times

Geoscience Australia had data and experience from years of SBAS operation in the Northern Hemisphere, but Australia's physical position in the world throws-up some unique conditions, mainly north the 20° South latitude line, which runs from north of Port Hedland in WA through Tanami to Bowen in Queensland. Above this line, things get squirrely with GNSS.

"Australia's space weather conditions are unique because of our proximity to the equator," Rose explains. "Space weather conditions, especially in northern Australia, have some impact on the GNSS signals, caused by an interaction between solar winds and Earth's magnetic field.

"The field lines close to the geomagnetic equator are weaker, leading to so-called 'plasma bubbles' in the Earth's ionosphere. This affects the performance of the SBAS signal, particularly in its use for aviation purposes.

"These are the unique conditions Australia finds itself in given the top part of our landmass is located close to the equator."

Even with the more stable conditions below that line, Geoscience Australia and Airservices elected to carry out substantial testing of augmented GNSS before settling on SBAS as the best option for Australia.

In 2018, Airservices contracted Air Affairs Australia to conduct a number of SBAS-enabled approaches as part of an industry trial managed by Geoscience Australia. The intent was for Airservices to gather feedback on the advantages and disadvantages of SBAS approaches as from the point of view of GA operators.

The aircraft selected for the trial was Beechcraft B200T King Air VH-LAB. This aircraft and avionics fit was typical of a common twin-engine IFR aircraft used predominantly to support charter and airwork. The aircraft was already fitted with a Garmin GTN625 unit. An Approved CASR Part 21M organisation was engaged to draft the Engineering Order to install and operate a modified Garmin GTN625 unit supplied by Airservices.

The crew conducted a series of RNAV-Z (GNSS) LPV (localiser) approaches into runways at Mt Hotham, Benalla, Wagga Wagga and Canberra. All approaches were flown in VMC under VFR. Although a safety-

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pilot was carried throughout the trials, the checklists and standard operating procedures used were for single-pilot operations.

The results were outstanding.

On the approach into Mount Hotham, the Garmin showed a Vertical Figure of Merit (VFOM) of only 20 feet and a Horizontal Figure of Merit (HFOM) of just 10 feet. What that means is that the system is confident it can place the receiver inside a circle that is less than one-third of the wingspan of a Cessna 172.

More importantly, the accuracy of the measured altitude is better than an altimeter with a set QNH one millibar out.

Not only did the trials prove that an operational SBAS system would increase safety for crews operating IFR into regional airports, but also they showed that aviation would derive an economic benefit from SBAS estimated at $404 million over the next 30 years.

There was really no reason not to go ahead and build SouthPAN.

The wins for GA

In 2003, a Beech King Air struck a sea wall on approach to Coffs Harbour. In 2004, six people were killed when a Piper Cheyenne struck terrain trying to get into Benalla. In 2005, three people died at Mount Hotham when a Navajo crashed on approach. Lockhart River alone has a score of 20 dead: 15 in a Metroliner in 2005 and another five in a C404 in 2020.

We could go on, but this litany of tragedy is enough to illustrate how fraught instrument approaches can be when the conditions and navigational vagaries are against you.

An APV approach with vertical guidance, as would be possible under SBAS, has been estimated as eight times safer than an approach with lateral guidance only. Yes, a decision height of 250 feet is one benefit, but SBAS also eliminates gross errors when pilots are managing the altitude AGL without any other guidance.

As it stands in Australia today, you can't perform an APV approach unless your aeroplane is fitted with Baro-VNAV, which currently is a tool exclusive to the airlines. SouthPAN will extend that capability to GA, which means airline-level safety on approach to airports that have no ILS.

It's not a coincidence that all of the accidents mentioned above happened at regional airports, nor, perhaps, that two of those airports were included in the SBAS trial.

However, there are some limitations. Although SBAS promises a decision height (or Height Above Threshold – HAT) of only 200 feet, that will apply for landings only at precision approach runways where appropriate lighting is installed. Where the runway environment and lighting is good for LNAV/VNAV, the HAT will be upwards of 250 feet, depending on surrounding obstacles.

That's still a vast improvement over the current capabilities, and SBAS will still provide GA aircraft with:

- lateral guidance that provides angular convergence to the runway
- a vertical path defined in software from SBAS-corrected satellite data
- no Baro-VNAV temperature limits or glidepath-specific barometric input.

SouthPAN is expected to be available to almost all non-airline IFR aircraft using equipment acquired to satisfy ADS-B surveillance and Performance Based Navigation (PBN) mandatory requirements.

What it all means

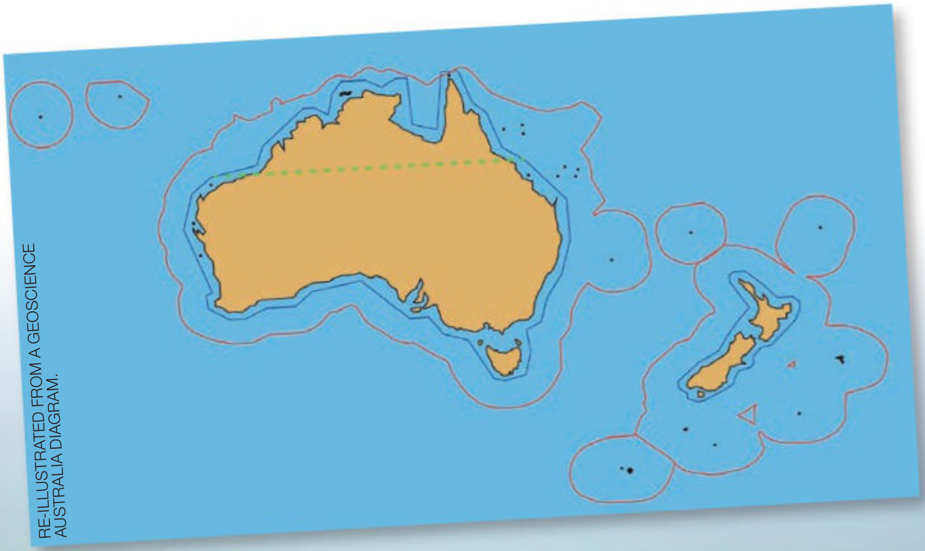
SouthPAN will make IFR operations much safer. Although the Geoscience/Airservices trials showed that it will make VFR flight incredibly accurate, it's a precision that visual flight doesn't need in an aid-only function. IFR pilots are the big winners.

Whilst it can be argued that reducing the precision down to 3-4 metres is not much value given that pilots will still need to have visual contact with the runway from 250-300 feet AGL, the technological leap clears a fence into an area that permits APV without needing prohibitive Baro-VNAV equipment.

Aeromedical PC-12s will be able to fly into regional airports in marginal conditions with greater levels of safety, business jets will have greater confidence that they won't have to use their alternates, charter flights can tackle tricky approaches through unforgiving terrain knowing they have greater certainty of precision than ever before.

All of that has been available to aviators in Europe and the USA for many years, and more recently pilots in India have enjoyed these luxuries with their GAGAN network.

Thanks to SouthPAN, it will be our turn in 2028.



RE-ILLUSTRATED FROM A GEOSCIENCE AUSTRALIA DIAGRAM.

LEFT: SouthPAN will cover a large sector of airspace around Australia and NZ. SBAS L1 service will be available within the blue line, with PPP and the future DFMC coverage extending out to the red line.

BELOW: Canberra was one of the locations chosen for the SBAS test.

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Periodic Learning

Call it an annual, call it a 100-hourly. It's the same thing: a periodic inspection, and it's a routine part of aircraft maintenance. **Steve Hitchen** experienced his first periodic inspection and found that from an RAAus point of view, it can be a very misunderstood aspect of recreational and LSA ownership.

When I handed Tecnam Bravo 24-5300 over to the MRO for its periodic inspection, I thought it would be back in a couple of days after a quick health check. The aircraft was in great condition and flew magnificently even hands-off. This was the first time in my flying career that I was sending my own aircraft in for a periodic.

The exercise would prove to be one of the largest and most complex lessons I would learn in my aviation career, a lesson which wiped out the last vestige of naivety I had left.

Also known as the 100-hourly or the annual inspection, a periodic must be done for the maintenance release to be renewed, and as the common names suggest, has to be done every 100 hours or every 12 months.

Having spent my 38 years of aviation in the GA stream, I understood well that only a maintenance engineer could perform a periodic inspection. But 5300 is not a GA plane; it's an LSA registered with Recreational Aviation Australia (RAAus), and one of the main points of differential is that you can do your own maintenance on an RAAus aeroplane.

But it's not that simple. Periodic inspections take time, skill and a touch of knowing what the hell you're doing to make the aeroplane safe and airworthy again. Just because you can, doesn't necessarily mean you should.

RAAus takes periodic inspections as seriously as CASA does, so before you reach for the screwdriver, there is a lot you need to understand about what you are about to do.

Periodic philosophy

Jared Smith is Head of Airworthiness and Maintenance at RAAus. He has a menu of qualifications behind him including a Bachelor of Aviation (Technology) and Business Management, Graduate Certificate of Aviation, a CPL, instructor rating and is an RAAus L2 maintainer. He was the obvious starting point in my journey of learning about periodic inspections.

"Generally the rule is that the manufacturers schedule must be followed," he told me. "That's for all aircraft on the RAAus register. For amateur-built aircraft, it is possible that an owner-builder can determine their own schedule.

"You follow the airframe manufacturer for the airframe–if you've got a Tecnam, you would use a Tecnam schedule for the airframe–but if it has a Rotax engine, then you would follow the Rotax schedule for the engine."

Keen to show that I had at least done some research of my own, I brought up the subject of RAAus Technical Manual V4.1, which seems to point at CASA Schedule 5 as an acceptable process for carrying out periodic maintenance. It turns out my analysis wasn't as accurate as I thought.

"The Technical Manual points to CASA Schedule 5 if there is no manufacturer schedule available at all. That's not a common situation, especially with the type of aircraft on our register.

"With LSAs there is a requirement for a maintenance schedule or they can't be issued a special certificate of airworthiness,

and the others they're type-certified and also would have a maintenance schedule."

It emerges that the only valid reason for no maintenance schedule existing is if you built the aeroplane yourself, but even then the larger kit manufacturers will have their own schedule, and certainly the engine manufacturer will.

The data itself comes from several sources: the schedule, Service Bulletins (SB), RAAus and CASA. The engineer performing the periodic needs to construct the work and inspection schedule using data from all these places. Although SBs are not mandatory for VH-registered aircraft, they are for RAAus aircraft and are in addition to the manufacturers schedule.

And speaking of engineers ...

The who of it

The epithet, often espoused with enthusiasm, "RAAus owners can do their own maintenance" is not strictly true in a raw sense. When it comes to inspections and repairs, RAAus needs to know that you're not a complete mug with a spanner, so issues maintenance approvals. The most common out there are L1 and L2.

An L1 has been approved to work on their own aeroplanes based on evidence of mechanical and technical nous. It's not automatically granted; it must be applied for and approved.

There was a time–prior to 2016–that qualifying for an RPC also conferred upon you L1 rights, but random audits revealed discrepancies that exposed a lack

MAIN IMAGE: The team at Istria get cracking on the periodic inspection for Tecnam 5300. The maintenance release had expired on calendar.

ABOVE: With no mechanical nous in my DNA, I was pleased to hand 5300 over to a qualified engineer with L2 authority.

LEFT: Depending on the schedule, a periodic may require the prop to be removed. That was not the case with 5300's Airmaster.

BELOW LEFT: It's all about the schedule. Istria used data from several sources to create a work list for the periodic inspection.

"The best of them want to hand your aeroplane back to you in much better condition than you gave it to them"

of foundational knowledge within the L1 ranks. For example, some owners took the term "100-hourly" seriously and did the periodic every 100 hours regardless of how many years had elapsed.

It forced RAAus to tighten the rules and create a definition of L1 that had greater integrity.

"There are two things excluded from L1 maintenance authorities: welding a manufactured aircraft and calibrating transponders and the pitot-static system on aircraft to be operated in controlled airspace," Smith explains.

"Everything else an L1 is permitted to do, provided the aircraft is used on private operations. That does not include if the aircraft is used for flight training or is hired out.

"The caveat there is that the individual is self-assessing their competence to carry out the work. In most circumstances, those who are getting in the aircraft and venturing thousands of feet in the air are well invested in ensuring the work is carried out to satisfactory standards."

L1s can perform periodic inspections on their own aeroplanes and sign the logbooks. They can't do that for a third-party's aeroplane, and they can't do periodics on aircraft that are offered for hire or used in a flying school. For that, you need to have a Level 2 approval.

"RAAus issues an L2 authority on the basis of qualifications and experience. We have a minimum requirement to assess skills and qualifications and we issue maintenance authorities on that basis.

"A Part 66 licence holder would be able to obtain a Level 2 Maintenance authority based on their licence. However, RAAus is also able to accept applicants from the military, for example.

"We also have a number of motor mechanics who have a trade qualification and would have built their own aircraft and maintained it for a number of years.

"The main purpose of an L2 is that they are permitted to carry out work on a flying school aeroplane. You would have no other reason to apply for an L2 other than that."

Sending your RAAus aircraft to a Licensed Aircraft Maintenance Engineer (LAME) for its periodic seems a no-brainer, but even a LAME with a Part 66 authority needs to apply to RAAus for an L2 regardless of years and experience in the aviation maintenance industry. RAAus is member-based, and the LAME needs to be a member.

For an L2 to remain active and approved to work on your aeroplane, they have to do at least one periodic inspection every year and the authority is renewed every two years. LAMEs are exempted from renewals provided their Part 66 remains valid.

So without an L1 approval (and a self-confessed absence of mechanical skill), I opted to commit Tecnam 5300 to Istria Aircraft Engineering at my home airport of Lilydale, Victoria, a Part 66 operation with L2 authority. I tossed the keys to the engineer with a flippant naivety and hit him with a dismissive "just call me when it's done."

Oh, ye of little wisdom.

Breaking it down

A few days later, the LAME presented me with two things: a run-out sheet that listed every lifted component on the aircraft and its status, and a long list of SBs that need to be done before I got 5300 back. It was startling. Inspections, replacements, spare parts, repairs ... I was given a very abrupt and forceful education on what a

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ABOVE: Anyone can remove an inspection cover, but realistically, would you know what it is you're looking for?

OPPOSITE PAGE: Rotax hoses have a five-year life, and the lives on those fitted to 5300's 912 were over.

periodic inspection really meant. Time, dollars, patience. I needed to have plenty of all of these.

"Most manufacturers' maintenance schedules will include a line item to check service bulletins and airworthiness directives," Smith said later. "For RAAus aircraft, service bulletins issued by the manufacturer are mandatory.

It is part of the maintenance schedule to confirm service bulletins, because there may have been a service bulletin issued since the aircraft had its last periodic inspection, or there are service bulletins that were issued and are ongoing"

Then came the news about the hoses.

Every owner of a Rotax-powered aeroplane knows that every five years the cost of the periodic inspection is going to skyrocket. Rotax mandates replacing all the engine hoses after five years, and these are not the sort you get at Supercheap Auto or Bunnings. They're high-quality parts and are priced accordingly.

And on 5300 their life had expired a couple of months ago, meaning they all had to be replaced on this annual inspection. When I first went through the books before buying the aeroplane, I noted that the oil hoses had been replaced only a couple of years ago. Satisfied, I looked no further, and failed to see that all the other hoses were due for replacement at the next periodic inspection.

I took that on the chin, but the news didn't stop there.

LAMEs are professional people. The best of them want to hand your aeroplane back to you in much better condition than you gave it to them. They will find things that could be better even though they may not yet be ready for replacement or repair.

And this is what Istria did with 5300. I was handed a list of optionals accompanied by suggestions that I get them done now: trim hinges, aileron hinges, engine mounts. All were still serviceable, but were showing signs of wear and would probably need replacing soon.

In respect to aircraft ownership, I just got here. Aware of my inability to make an informed judgement call, I authorised everything they suggested. It was the easiest decision to make, and probably the safest.

All had been said, but not done. And that's where time and patience came into it.

The air and the spare

Istria's engineers presented me a maintenance schedule for the periodic inspection that worked hand-in-hand with the run-out sheet. The schedule amounted to a list of work they were going to do before they could issue a new maintenance release.

At first glance, it was an intimidating document that threatened the health of my bank account, but after the second or third pass, I realised most of it was just a break-down of what a periodic inspection actually is.

And it includes things like battery service, CO_2 detector check, radio inspection, ASI test, inspection panel security, electrical wiring, rudder cable terminals and so many other

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ADELAIDE BIPLANES

things that to list, would make this a very boring feature article. There was even a line item to vacuum the interior.

They also created a list of spare parts that I would need to source from Tecnam Australia. This included components needed to comply with the SBs, and a few that were showing signs of wear and Istria thought it best to replace them now: bolts, hinges, springs and engine mount parts.

I was relieved to find that all but two of the parts were ex-stock at Tecnam's store in Southport, QLD. It was the other two bits that were to cause me the greatest grief. They had to go on a slow boat from Capua and would be delivered to Istria in some five or six weeks time.

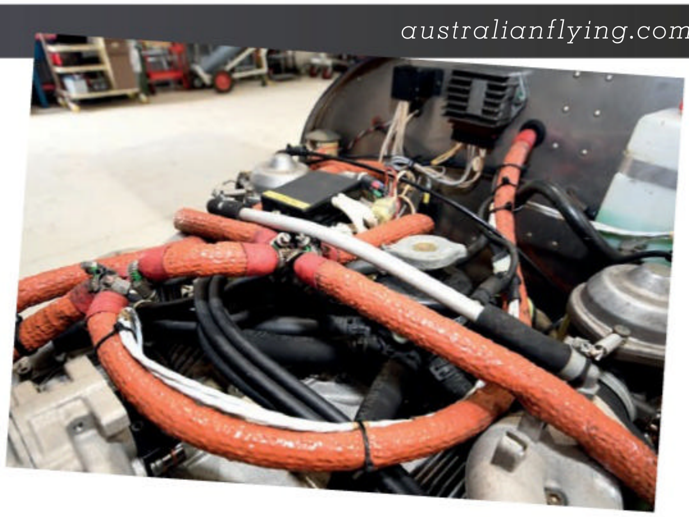
Tecnam 5300 was going to be out of service for some time yet. What happened to my quick and simple periodic inspection? It was probably always somewhat of a myth, but I was only just learning that now.

DIY periodics

Continuing airworthiness is not a game; it's a very serious aspect of aviation that is often not well understood, especially with RAAus-registered aircraft. But that's not for the want of RAAus regularly auditing and educating. There is a reason they tightened the L1 rules in 2016.

I was fortunate enough to have given 5300 to a professional organisation, but the time and cost was enough to make me start thinking about getting an L1 authorisation and doing it myself.

Then it occurred to me that I was learning the wrong lesson. DIY periodic inspections and L1 authorisations were invented for the mechanically street-wise, not the spanner mugs such as myself. For the likes of me, we have L2s to ensure the aircraft is properly maintained.



And with all the work that's involved just in creating a maintenance schedule, there is plenty of opportunity to miss something important and twisted incentive to take short cuts to save time and money.

Back to Jared Smith.

"The L1 assessment provides aircraft owners with an understanding of the rules and responsibilities and also outlines a basic foundational knowledge of aircraft maintenance," he pointed out.

"Many of our aircraft owners will have an L2 or a LAME carry out the annual inspection every second year as a method of quality control.

"Carrying out the research prior to the annual inspection is very important, and make sure you don't rush through the schedule. Take the time to go through each line item. RAAus randomly audits logbooks from time-to-time and on occasion, the owners understanding of an annual inspection is that only the oil and filter need to be changed!

"That's not compliant and not safe."

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Right Seat rules JIM DAVIS

Jim Davis has a passion for instructing. He has been training civil and military pilots, in the air and on the ground for 50 years. His other passion is writing, which he studied at Curtin University in Perth. You can see, and buy, his two pilot text books PPL and Flight Tests at www.jimdavis.com.au

Gods of the Chariots

Jim Davis opens a new series aimed at making better instructors and showing students what they are entitled to expect in a lesson.

NEXT STOP 500-KM

Some philosophers hold that we have no free will – we are propelled through life by our genes and our experiences. If that is the case, then I had no choice but to be a flying instructor.

Genetically, I am extremely lazy, easily bored, and strongly resistant to being a team player. So, when scanning the world for a career, I realized that aviation was right up my street. I also come from a line of teachers so it seems the philosophers are right – I really had no choice in my career selection.

So yay for genes and history! I can't think of a more rewarding, and enjoyable way to be paid for having fun, and avoiding work.

This article is going to be Chapter 1 of a book about stuff I have learned while trying to be the best instructor I can. It's going to be a mish-mash of flying stories and hints and tips for all pilots, and particularly, instructors.

Instructors: yours is the highest calling in aviation, so give it a full go and be proud of it.

Here's your first hint and tip: Did your instructor ever tell you how to judge when another aircraft is above or below you? If it's above the horizon it's above you, and if it's below the horizon it's below you.

It's the same with cloud tops and cloud bases, and birds, and hill tops and radio masts, and even power lines. Anything above the horizon is above you and anything below the horizon is below you.

Strangely this doesn't quite work at airliner altitudes, and I'm not sure why.

Anyhow, whether you are looking for an instructor, or whether you want to be a really good instructor yourself, here are the qualities that make up the ideal instructor.

Enthusiasm for all things aviation.

A love of teaching. Great teachers get huge pleasure from their students' successes.

A sense of humour. The occasional joke or bit of leg-pulling makes everyone relax and enriches learning.

Patience. A good instructor enjoys even the baby steps of slow learners.

Professionalism. Professional instructors dress smartly, stick to the rules, don't cut corners and always treat their student with respect and dignity.

Experience. The more experience they have the more they can pass on. New, young instructors can make up for their lack of experience by embracing other qualities – particularly enthusiasm and a passion to learn from every flight.

Integrity. The pupil must know that you will be honest with her. She'll respect your criticism, and believe your praise is sincere. But she'll be quick to spot any deception.

Smooth handling. A good instructor's flying is smooth, polished and accurate.

A spirited attitude. This doesn't mean cowboying – it means enjoying tough conditions like gusty crosswinds, spin training and aerobatics.

Role model qualities both in the air and on the ground. Top instructors never do anything they would not be proud to see their students do.

Initiative. Good instructors find new, interesting and memorable ways to explain things. Much more about this later.

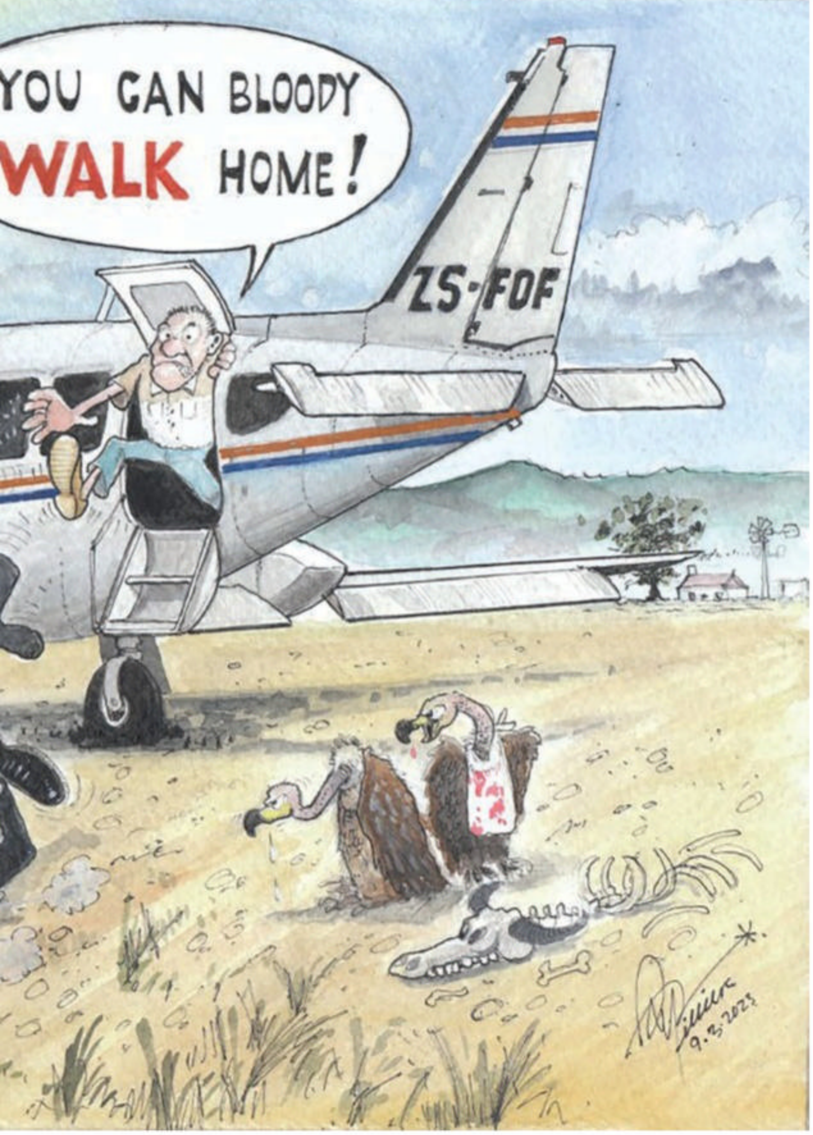
Airmanship. Their airmanship is always immaculate.

Insight. Great instructors get into students' heads. They understand student thinking, and can judge rates of learning, attention spans and why students do certain things.

Resist talking too much. New instructors tend to chatter in flight. Most of the talking should be done on the ground. In the air, a good instructor will remind, not teach.

Embrace mistakes. Students learn best by making mistakes, recognising them and correcting them.

As one of the most experienced instructors to teach flying in both Australia and South Africa, Jim Davis has amassed a wealth of personal knowledge about how to tutor both student pilots and experienced pilots at all levels of their careers. His advice laid out here is directed at instructors, but contains a lot of good material equally valuable no matter which seat you sit in.


YOU CAN BLOODY WALK HOME!
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LEFT: A good instructor will respect your time, and if bad weather causes a flight to be canceled, will offer a ground briefing instead.

BELOW: Instructors need to dress well, display good qualities on the ground and set good examples of airmanship. The student already thinks you're a god. Live up to that.

Is analytical. He looks for root causes of errors – not the symptoms.

Makes accurate statements. Top instructors pick their words carefully, and avoid ambiguity. Airspeed doesn't go "up" or "down" – it increases or decreases.

Is consistent. Procedures and standards must be dependable.

Punctuality is vital. A late pilot is likely to become the late pilot.

Is positive and generous with praise and encouragement. He or she ends every lesson on a constructive note.

Respects your time. They don't cancel a lesson due to weather. They brief their students, or sit in the aircraft with them and go through checks and procedures.

Okay, let's get on with it – exercise by exercise.

A little TIF

Instructors, this is your chance to shine. It's the most important flight you will ever make – so don't stuff it up.

Actually you should feel honoured if the CFI gives it to you – ideally it's so important he should do it himself. It has two aims: set the standard, and attract a pedestrian into becoming a pilot

Setting the standard. This flight shows her, your potential pilot, how to behave around aeroplanes. If you show off like an immature cowboy, you can ruin her life. I am serious. You can either terrify her so she never comes back, or you can be a role model by behaving as if your boss was watching.

Drawing in a new pilot. You can transform this stranger's life – but you only get one shot at it. So make sure you do fly in decent weather – she has got to enjoy the flight. If you do it right you may find her in the front office of a Boeing you board in five years time.

Let that be your aim.

She doesn't want to know how smart you are – she thinks all pilots are gods, so confirm this belief, and be the most professional pilot you can.

Show her how safe flying is. Walk her slowly round the pre-flight and explain things she asks about. Don't hurry.

Sit her in the pilot's seat and

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LEFT: The burnt-out wreckage of a KLM 747 at Tenerife in 1977. Unclear and non-standard communication led to it colliding with a Pan Am Clipper. Words have power, and instructors need to understand that.

show her the most important controls and instruments. If this takes an hour that's fine. It's the most important flight of her life. And yours.

Explain about the radio and who you are talking to.

Don't do anything unexpected – always tell her what you are going to do before you do it.

Show her how to taxi and then let her try.

Briefly explain your pre-take-off vital actions and run-up.

Tell her what the take-off will feel, and sound, like. Show her the tacho and ASI and tell her what speed you will lift off, and your climb speed.

Do only gentle turns – 25° of bank or less. Get her to help look out for other traffic.

Show her the altimeter and explain the difference between height above sea level and above the ground.

Point out prominent features on the ground. Ask her where she would like to go – probably over her home. See if she can find her way there.

Point out the horizon and explain its importance. Show her the basic effects of the aileron and elevator and let her have a go at straight and level flight, and gentle turns.

Tell her if she is doing well, and make allowances if she is not. For her, there's a lot of strange stuff happening – she is not going to get everything right first time.

Make this flight the best thing that's ever happened to her.

If you stuff this up I will hear about it and get CASA to put your license through their confetti machine.

> **« Most of the talking should be done on the ground. In the air, a good instructor will remind, not teach. »**

The power of words

Instructors, your job is to use words wisely. They are your main teaching tool. You are not there to push and pull things in the cockpit.

Your words have immense impact – never underestimate their power for good, or for harm.

We have all heard the saying that the word [or pen] is mightier than the sword – take this very seriously indeed. Let me give you an example of how a single word inadvertently killed 583 people in the worst tragedy in aviation history.

Remember the Tenerife disaster in 1977 when two Boeing 747s collided on the runway? The captain of KLM 4805 thought he had take-off clearance, when he had only departure clearance for *after* take-off. His aircraft smashed into Pan Am 1736, which was backtracking on the same runway in thick mist. The crash killed everyone on the KLM flight, and all but 61 on the Pan Am flight.

The critical word behind this disaster was "take-off". Briefly, on an instrument flight you will get three clearances:

- your normal taxi clearance
- your departure clearance which specifies the initial route to follow. It will be something like this: "Alpha Bravo Charlie, after departure runway 28, climb on runway track to 5000 feet and then turn right to…"
- your take-off clearance: "Alpha Bravo Charlie you are cleared for take-off on runway 28, the wind is 270/15."

Notice that the word "take-off" is not used at any time except when ATC are clearing you for the actual take-off.

Previously, at the time of the Tenerife crash, ATC departure clearance was allowed to include the term "after take-off on runway". So, when Captain Van Zanten, who was pilot flying on the KLM flight, heard the word "take-off" he advanced the four thrust levers and accelerated down the runway towards the Pan Am 747.

The situation was further confused by a double transmission and some other non-standard terminology, plus the words "not cleared for take-off."

Van Zanten desperately wanted to get into the air. His was one of many flights that had been delayed by a bomb scare. He was worried about running out of flight and duty time. His whole being was orientated towards this take-off, so when he heard that word, there was no holding him back.

After this crash the term "Hold your position" was mandated. Had it been used at the time, this horrendous disaster would never have happened.

I am trying to emphasise that your words give you a terrifying amount of power. It's all about finding the exact ones that will get the job done effectively and safely. Here's another example of the power of words.

When I did a flight test I could use a few words, while we taxied out, to make or break the pilot's chances of passing.

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I could say, "man, I really like your radio procedures", and that would set the tone for my enthusiast to do everything right – and comfortably pass the test.

On the other hand, if I said something like, "do you always taxi like this?" while making a note on the test form, he would perform so badly that he was almost guaranteed to fail.

Of course I never did that, but for many years the CAA employed a flying inspector called Swanepoel – I don't think he had a first name. He loved to intimidate pilots before take-off. He would loosen his seat belt after you had checked it. He would unlatch the baggage door after you had latched it. He would tell you to hurry, and then mark you down for doing so. You had almost no chance of passing a flight test with Swannie.

Naturally, we got fed up with this tyrant. Occasionally someone would take revenge. They would land at distant farm strip and tell him to get out, claiming he was endangering the flight.

Brilliant, because this was in the days before cell phones, so Swannie would have to walk to the nearest farm house to phone his boss, Carel Sembach, and ask for a car to come and collect him.

In this series I am going to give you plenty of examples of using the right words.

Getting it right

Instructors, and others, here's something to think about. Have a look at this simple instruction and see how many things you can find wrong with it:

Push the stick forward so the airspeed goes up.

Does it sound okayish? Actually there's so much wrong with it that it's hard to know where to start. Let's kick off with the first word: "push".

Do you really want someone pushing and pulling stuff in the cockpit? It sounds more like the way you might handle the controls of a railway engine.

In aeroplanes you want a pilot to handle all the controls smoothly. My very first instructor, an RAF pilot, told me that I should always fly as if my grandmother was in the back with a basket of eggs on her lap. Passengers should not feel it when you do things – particularly changing flap, or power, settings – it should all be smooth and gentle.

So don't ask your student to push or pull anything. They might do exactly what you say, and have you floating out of your seat as they push the stick forward.

This is common with stall

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LEFT: Instructors need to demonstrate smooth manoeuvres in flight if they want students to do the same.

OPPOSITE PAGE: Always treat your student with respect and dignity, even if you have to deliver a rebuke.

recovery. Ask half a dozen pilots how they recover from a stall. The standard answer will be, "I push the stick forward". Some actually do this in the aeroplane and frighten themselves to the extent they are scared to practice stalls again.

The proper answer is, "I *ease* the stick forward until the wings are unstalled". And, of course, if you do that, then stalls and recoveries are fun.

Actually stall and spin recoveries are amongst the very few occasions when you should tell students what to do with the stick.

On most occasions the Golden Rule is: as far as possible, never tell students what to do with the stick – tell them what to do with the aeroplane.

So going back to the example I gave you, we want the student to ease the nose down, but we didn't tell them how far. Vertically? Of course not. It sounds silly because we know what we mean, but we are not giving the student a clear instruction. We want them to ease the nose slightly below the horizon.

And while we are on the subject, a new and dubious, term is creeping into what instructors say. They tell people to apply pressure to the controls. Applying pressure does nothing – every control has to move before you get a result. Applying pressure to the flap lever on a Cherokee isn't going to do a damn thing.

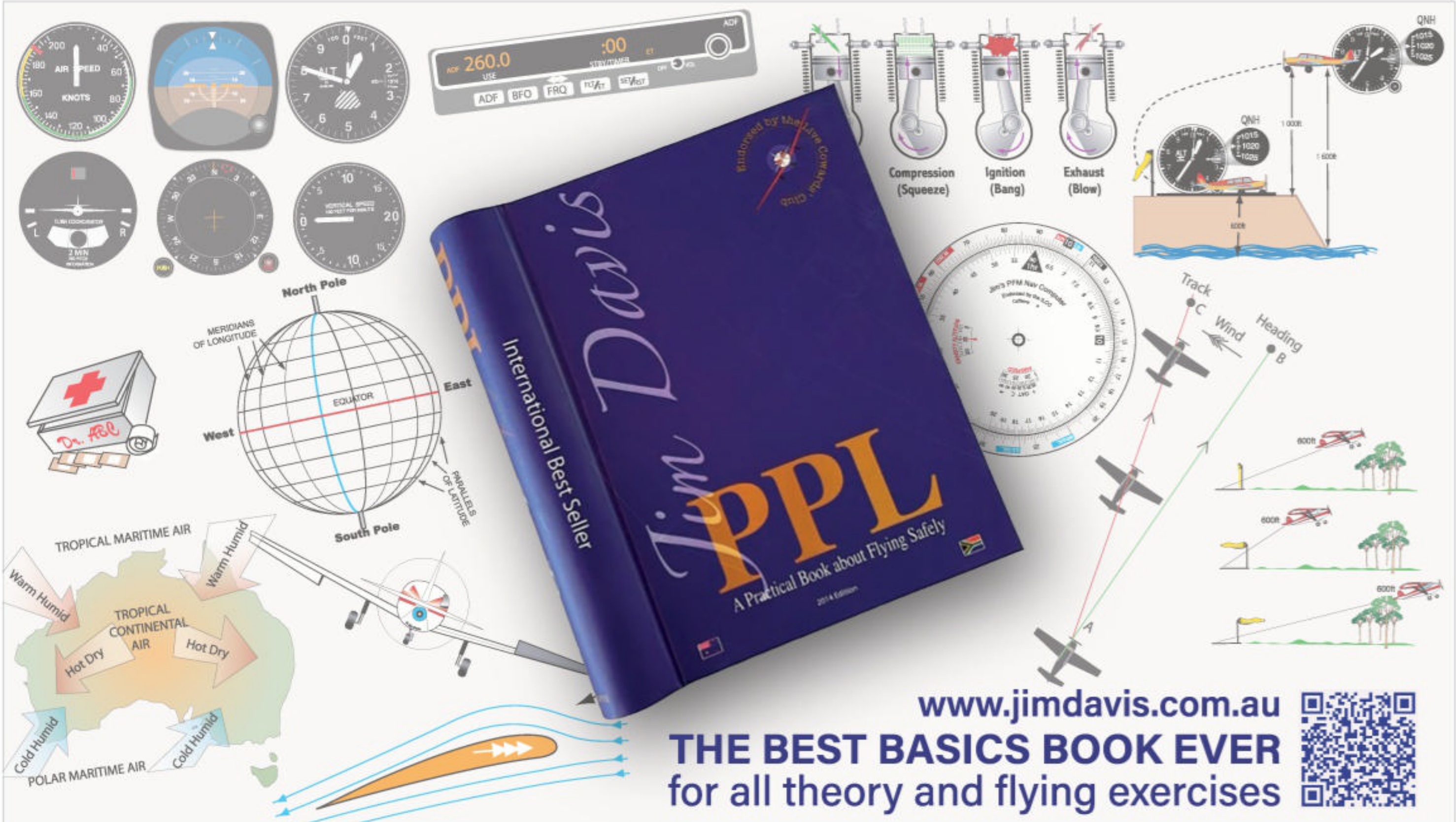
Applying pressure to the throttle may or may not work depending on how tight the friction nut is. Applying pressure to the right rudder in the climb is probably not what you really want – you probably want them to reduce pressure in the left rudder. Rather, tell them what result you want, "use enough rudder to get the ball in the middle."

Besides, it makes no sense telling a pilot to apply forward or back pressure to the elevator unless you know the state of the trim.

And – we still haven't finished with this terrible sentence. Do we really want to muddy the waters by having things like airspeed, revs, oil pressure and amps, going "up" or "down"? Absolutely not. We want them to "increase" or "decrease". So don't confuse things with "up" or "down".

So the original instruction to *push the stick forward so the airspeed goes up*, should really be *ease the nose slightly below the horizon so the airspeed increases*.

Who said instructing was easy. Ha ha ha – it isn't. But it's a hell of a lot of fun, and hugely rewarding when everything clicks smoothly into place.



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Going Clubbing

Clubs have always been a huge part of Australia's social identity: think bowlos, RSLs, tennis clubs – no suburb is complete without one. Once, this was the case for regional airports too: the 1970s were the halcyon days for aero clubs. So, what happened? Are they in decline? **Kreisha Ballantyne** finds out.

When you think of an aero club, what comes to mind? An old porta-cabin, dead flies on a windowsill, yellowing copies of the crash comic? Or perhaps you think of sausage sizzles, fund raisers and cheap booze at the bar?

Do you imagine an ageing fleet? Aircraft so old they still have ashtrays and peeling patterned carpet sitting out on the grass in the open elements?

Or are you thinking of the swankier aero clubs, the ones with their own cafes, glass-cockpit equipped aircraft and lounges for lazing in whilst telling flying yarns.

And some have virtually nothing, existing as a loose group of enthusiasts without their own buildings, aeroplanes or indeed

ROYAL AERO CLU

shared bank accounts. To form an aero club, all you really need is a passion for flight and a desire to share your experiences with others of the same passion.

Aero clubs of all types have played their parts in the general aviation community in Australia, fostering aviation careers both private and commercial; professional and recreational. They have been the bedrock of GA in Australia since the fledgling Federal Government recognised the value of aviation in the early 20th century.

Since then, many clubs have risen and many clubs have fallen. There are still aero clubs around today, but the hurdles they face in a challenging GA environment are threatening their futures.

ROYAL AERO CLUB OF WA

A look back

Australia's first civil aviation organisation was an aero club, the Australian Aero Club, affiliated with the Royal Aero Club of Great Britain. Formed on 28 October 1914 at Point Cook, it opened its books with only six members: Petre, Harrison, Williams, White, Manwell and Merz. All were members of the freshly-minted Australian Flying Corps (AFC). One, Lt Richard Williams, would go on to be one of the founding fathers of the Royal Australian Air Force in 1921. Point Cook air force base is today named in his honour.

Allan Bligh OAM is the president of the Royal Federation of Aero Clubs Australia (RFACA). He takes up the story from there.

"That done they turned to create civil aviation," he says. "Having regard to the government being a bit short on funds after WW1, the business structure selected was the aero club, wherein the money of the many, created access to aviation for the individual.

"The aero club in Melbourne (now RVAC) was first then followed Sydney (RAC of NSW), Newcastle and Brisbane. Aero Clubs grew steadily between the wars, impacted of course by the Depression.

"It was after WW11 that aero clubs really expanded aided by cheap war surplus training aircraft and many expert instructor and engineers willing to give their time and use their skills to create aviation access to the individual. Is the aero club there to teach people to fly? If not, what is its core purpose?

"I say the club structure chosen not only has relevance today, but also will be vital for GA survival tomorrow. This is not a universal view."

Aero clubs grew in number and size, then around late 1950s to early 1960s came rapid expansion of fleet numbers with substantial outlays for new, modern, metal aeroplanes from the USA. This would tally with an aviation-cultured population, climbing out of post-war poverty into a position of having considerable disposable income.

The Australian GA fleet grew markedly through the 1970s; Piper Australia sold more than 100 new aeroplanes per year, Cessna, over 200 units. In late 1978, maybe 1979 the market faltered, and new aircraft sales slowed. Aero clubs faltered and growth slowed. Private flying school numbers increased.

ROYAL AERO CLUB OF WA

MAIN IMAGE: Royal Aero Club of WA can trace its roots back to the original Australian Aero Club.

ABOVE: With both their own aircraft and cross-hires, clubs often have very diverse fleet on the line.

Enter private training

Bligh believes that the circumstances aero clubs find themselves in today can be linked back to an aircraft glut and the rise of privately-owned flying schools.

"During this entire period of growth and glut most missed a significant marketing issue for aero clubs and flying schools that exists today," he says.

"A complex but unique marketing situation had arisen in the form of an aging post-war cohort who initially drove GA expansion, began to diminish through the attrition of age. Folks who were 25 at the end of WWII turned 60 in 1980, but manufacturers kept producing through the 1970s as if the market would ever grow.

"The manufacturers, pushing dealers to diminish stock, flooded the market, creating pools of low-time, late-model, as-good-as-new used aircraft, but at a fraction of new price.

"People (often instructors) who hitherto could not afford aircraft, found they could now buy aircraft and so arose a sizeable number of privately-owned, price-driven flying schools.

"Although a well-run aero club is a formidable business unit, many could not match the zeal and application of the new, private operators. Aero clubs suffered, decreased in number and size."

The first indication that the market was swinging back toward aero clubs came in 1995, when Piper launched the Archer III and Cessna was planning a comeback with a C172. The pool of used aircraft around the word began to diminish. Many of the first Archer IIIs were bought new by aero clubs, not private flying schools.

By 2000, it was obvious that the era of the cheap, low time, good-as-new aircraft was on its way out and that new aircraft pricing reflected the manufacturing costs. Aircraft built from 1994 onwards were re-selling at about their original new price after about five years of service.

Small clubs in regional areas operate on fewer resources, but with the same passion as their capital city counterparts.

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Being based at Moorabbin, Royal Victorian Aero Club faces similar challenges to other clubs that have facilities on leased aerodromes.

Replacing three elderly C712 or Warrior multi role, training aircraft became a serious fiscal issue, mitigated only by their now attractive trade-in prices. Increasingly, the huge financial burden of fleet improvement on now, mature aged flying school owners, took its toll on their numbers. It offers aero clubs an advantage.

"The LSA/RAAus pathway and equipment has some advantages and many clubs have embraced this sector," Bligh points out. "Yet, the potential of registered GA aircraft to offer an elevated level of arrival certainty, compared to LSA machinery, maintains their desirability for many clubs and groups.

"The community funding access to aviation for the individual is at the core of the aero club concept aided by the aero club's major objective of gaining assets for their members, rather than an immediate return on investment.

"Aircraft with long service life and high retained re-sale value play to the aero club advantage. But then, if aero clubs do not provide modern, well equipped, IFR standard aircraft to the individual Australian for private and business use, who else will?"

A Canberra tale

Canberra has had an aero club since 1938, when a small group of people "with flying in their blood" held a public meeting in May that year. By October, the national capital had its own aero club.

Fifty students each paid £25 to cover their training and buying a Taylor Cub. It was heady days for the club, but just two years later, the Second World War had taken its toll and the club ceased operations, to re-emerge in 1946 with two Tiger Moths as the clubs' fleet.

Today the Club consists of 185 members with either flying or social memberships. The Club owns outright three aircraft, a Cessna 172N VH-MUW, a Cessna A150N Aerobat VH-IWH and a IFR Piper Archer II VH-MIZ.

The club also has privately owned aeroplanes available for cross-hire, but it has been 25 years since they had their own flying school, opting instead to leave training to Canberra Aviation and Learn2Fly Canberra.

Norm Jones is the president of Canberra Aero Club (CAB). He outlined some of the challenges facing a club operating from a leased capital city airport.

"Operating in an environment with an increase in airline traffic does cause GA to suffer delays at the holding point, in addition to delays to doing circuits," he said.

"Currently the club's maintenance and inspections are undertaken outside of Canberra, this necessitates a chase aircraft to deliver and recovery the aircraft, adding further costs to our operations."

Club aircraft can be maintained as far afield as Cootamundra, Goulburn, Bathurst, Moruya, Cowra. It is remarkable to think that Australia's capital city has no GA maintenance facility, but that is the reality the club works with.

"The GA fraternity would love nothing better than to have a LAME permanently based at Canberra Airport for breakdowns and 100 hourlies, but as with all leased out Federal Government owned airports, its comes down to providing a LAME operation with a high commercial rent to deal with.

"Over the years the club has been approached by many individuals to establish a facility but it all comes down to the rental cost of the facility. Canberra Airport had three maintenance facilities, but these disappeared with the leasing out of the airport."

> **"The LSA/RAAus pathway and equipment has some advantages and many clubs have embraced this sector"**

Of course, operating from a security-controlled airport means ASICs and swipe cards are mandatory for CAB members, as are the associated costs. However, that is not the only cost burden that comes with a home on a major airport.

"In general, to park a GA aircraft in private ownership where an annual permit is purchased to cover the cost of all landing and parking charges, will cost you around $4500 per year for example a C172 or PA28 and approximately $7000 for a Piper Lance. The cost of a hangar is $11,00," Jones laments.

"Without an annual permit the Daily Access Charge for light recreational aircraft is $33.50 per day for MTOWs of 2500 kg or under, rising to $78.16 per day for 2501- 4000 kg, and $126.54 per day for 4001-5700 kg."

If it's a light commercial, those costs leap to $43.56, $101.61 and $164.55 for the same MTOW breaks. It makes operating from Canberra an expensive proposition.

But there are some bright sides: Canberra Airport provides two aircraft parking spaces and a 50% discounted on a third space, and six free car parking spots per year.

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Some larger clubs have had the ability to upgrade their fleets, such as the new Archer TXs on line at SFC.

And Jones believes the Class C environment is another plus.

"Once you are familiar with it, it's a pleasure to use with the friendly ATCs in the country," he says.

Crystal balling

As CAB president, Norm Jones knows well the challenges that face aero clubs, and believes the problems are exacerbated for those operating from the major airports.

"If they are currently operating at a Federal Government owned Airport–for example, Archerfield, Bankstown, Moorabbin, Parafield, Jandakot– then the future is bleak as the property development leasing company encroaches onto the airport infrastructure for more land to build on and the size of the airport quietly reduces," he reckons. "But if they lucky enough to operate in regional Australia then in most cases their future is sound."

Jones struggles to see flight training as part of the future of a healthy aero club, and believes there are other things that need to change to help clubs continue to be a valuable part of GA in Australia.

"Do not run a flying school as part of a club," he advises. "Small flying schools tend to go bankrupt at some stage in this era mainly due to high overheads and compliance costs. However there are some very good and large schools around such as RVAC and RACWA.

"Clubs need to involve their membership in the running of the club, and less over-regulation by CASA; the costs of running such an organisation and the stress effect it can have on pilots and owners.

"Preferably it should be run by a Federal Government department."

Way out west

One of the clubs Jones cites as an example of a good, large aero club is Royal Aero Club of WA – RACWA.

An offshoot of the original Australian Aero Club founded at Point Cook, RACWA was independently incorporated at Maylands in 1929, before moving to Guildford in 1955 and settling at its current home, Jandakot Airport, in 1965. Since then, RACWA has grown to be one of the largest aero clubs in Australia with an enviable track record of turning out quality pilots.

Alan Wilson is the secretary of RACWA. He points out that the club is very diversified and benefits from a membership base of 800 paid-up and passionate aviators.

"We operate both Part 141 and Part 142 flying schools," he told *Australian Flying*. "RACWA has three main parts: the aero club that services our members flying, training and socials needs; the Western Australian Aviation College, that as a Registered Training Organisation provides Diploma in Aviation courses, and our engineering maintenance hangar that provides comprehensive maintenance and aircraft repair services.

"The club is based in Jandakot but also has an annexe at Murrayfield Aerodrome, which provides flight training, recreational flying and even a charging facility for Pipistrel electric aircraft."

"We are very fortunate to have a dedicated and passionate team of full and part time Instructors spanning from Grades 3 to 1 and all the way to CASA approved examiners. Our instructors have a wide range of experience ranging from recent graduates through to industry icons such as John Douglas and Glenda Dyke, with over 50 years' experience."

For all its weight of membership and resources, RACWA faces similar challenges operating from Jandakot as their colleges in Canberra do.

"Jandakot is a busy airport so the ongoing challenges of managing congestion, encroachment from urban in-fill and coping with ever increasing operating costs, inflation and skill shortages in order to keep flying affordable to our members and students, are material challenges," Wilson says.

"It is heartbreaking to look back at the systemic decline in aero clubs across Asia Pacific over the past 25 years and the impact this has had upon the aviation community. Aviation is a critical sector of the economy and GA plays a pivotal role at the grass roots level to nurture, develop and inspire the next generation of aviators.

"Aero clubs remain relevant and even more important today to provide the fabric that keeps people flying, connected and engaged with aviation throughout their lives.

"I believe aero clubs will need to evolve and embrace net zero, and lead the way to provide renewable and affordable flying in the future."

Wilson nominates the enduring skills shortage that has plagued GA for several years as one of the major obstacles to growth for aero clubs.

"There is a critical skill shortage facing GA across LAMEs, AMEs, instructors and pilots that is limiting the growth of the sector and will become acute once aviation recovers to pre-pandemic levels," he explains.

"Hence, a coordinated program and incentives to address this skills gap, particularly with LAMEs before the current generation retires, would be a material benefit to the sector as a whole."

with Steve Hitchen

Coonabarabran Aero Club in regional NSW. Passion drove it to win the 2019 Aero Club of the Year award.

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100 Years of Rotary Aviation

Tony Self looks back across 100 years of rotary aviation and revisits some of the pioneering machines that have made helicopters and gyros so versatile.

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FROM TOP: Igor Sikorsky in the VS-300 prototype in 1938.
The Focke-Wulf 61 was one of the earliest tandem-rotor helicopters.
MAIN: Guimbal's Cabri G2 is one of a new breed of rotary craft penetrating the Australian market.

The year 2023 marks the 100th anniversary of the rotorcraft … or does it?

On 13 November 1907, a helicopter designed and constructed by French inventor Paul Cornu took to the air. Well, it lifted the 260 kg of the machine and its pilot to the dizzy altitude of one foot for around 20 seconds. Cornu soon realised that the 27-hp engine wasn't powerful enough to drive the big rotors, and the project didn't go much further than a few test flights.

But a few months earlier, some other French inventors, the brothers Bregeut, had managed to get a tethered gyroplane-type machine off the ground.

Inventors were experimenting with different configurations and control methods. In 1912, a Danish pioneer, Jacob Ellehammer, built a helicopter with contra-rotating rotors and a cyclic pitch control, and managed a few short hops off the ground. But it was a decade later that a helicopter flew for more than a minute, when American George de Bothezat managed a two-minute flight under some sort of control.

Two years later, rudimentary helicopters in France were flying a one-kilometre round circuit.

Meanwhile, in Spain, the aircraft that many experts now claim was the first successful rotorcraft was proving its capability. Juan de la Cierva had been working on the autogiro, or gyrocopter, where the rotors are not powered, but revolve with forward movement of the aircraft, acting as a rotating wing.

On 9, or possibly 17, January 1923, the Cierva Autogiro C.4 made a successful flight of 180 metres.

The Cierva C.30 was probably the most successful of the stream of designs, with 148 built under licence by Avro in the UK, Focke-Wulf in Germany and Lioré-et-Olivier in France. Three C.30s made their way to Australia, and one is on display in the Powerhouse Museum in Sydney.

There were now two streams of rotorcraft design: the helicopter and the autogyro.

Igor Sikorsky was a Ukrainian aircraft designer who emigrated to the USA after the Russian Revolution of 1917. After working for a while as a schoolteacher, Sikorsky founded Sikorsky Aircraft in 1923, working on large flying boats.

After a takeover and a merger, the company became Vought-Sikorsky, and the focus changed to helicopters, picking up from Sikorsky's earlier Russian helicopter work. His VS-300 became the first American helicopter, with the standard configuration of most helicopters today: main rotor and anti-torque tail rotor. But Germany's Focke-Wulf 61 had beaten the VS-300 to the honour of being the first practical, functional, "modern" helicopter, which flew in 1936.

The Fw-61 had a configuration similar to the autogiro, with an aircraft fuselage and radial engine up front, but had two powered rotors on outriggers. It was famously demonstrated indoors in 1938 by the legendary pilot Hanna Reitsch, and set speed and altitude records (11,000 ft!).

But these practical helicopters, like the Russian TsAGI1-EA, were still a novelty, and never reached production. But it wasn't long before helicopter production started, and by the end of World War II, militaries around the world were deploying rotary-wing aircraft.

Korea: the helicopter rises

The most recognisable mass-production helicopter is the Bell 47. Perhaps the TV show M*A*S*H contributed to that recognition, and it is certainly true that the Korean War marked the rise of the helicopter. At the start of that war, the US Army had just 56 helicopters. Four years later, helicopters had transported more than 20,000 casualties, and the term "medevac" had entered the lexicon.

The Bell 47, known in the US Army first as the R-13, and later the H-13 Sioux, was very basic … some not even carrying radios. The Bell company was to become a big name in helicopter production. Their first rotary-wing machine was the Bell 30, which first flew in 1943, and which was developed into the Model 47. The 47 was the first helicopter certified for civilian use, and started with a 157-hp Franklin six-cylinder piston engine.

> **"Corporate and personal helicopters became a possibility too, as production costs reduced."**

Alongside the US Army H-13 Sioux helicopters were the similar sized Hiller OH-23 Raven, the heavier-lifting Sikorsky H-5 Dragonfly and H-19 Chickasaw, and the twin-rotor Piasecki H-21 Workhorse (better known as the "Flying Banana").

The RAAF and RAN had been keen to test the usefulness of the helicopter, and the RAAF's first Sikorsky S-61 Dragonfly was delivered in 1947. The Royal Australian Navy borrowed some US Navy Dragonflies, and later some Royal Navy Dragonflies, to serve as HMAS *Sydney* rescue helicopters during the Korean War.

The helicopter war

It was another war, the Vietnam conflict, which saw the helicopter move beyond its early use for medevac. By the 1960s, helicopter design had leapt forward with the development of turbine helicopter engines. Rotary-wing aircraft could now carry enormous loads, at impressive speeds over long distances, and were reliable and rugged workhorses.

The most iconic helicopter of this time was the Bell 205/UH-1, known variously as the Huey, Iroquois, Bushranger, and Cobra. Powered by a Lycoming T53 turboshaft engine, the UH-1 could carry 1700 kg of cargo, 14 troops, or six stretchers, at 120 knots for over 200 miles. In RAAF Bushranger configuration, the Iroquois was armed with forward firing miniguns, 14 rockets and two door mounted twin M-60 machine guns.

The dedicated ground attack development of the Huey, the AH-1 Cobra, was extremely heavily armed, and became one of the most effective weapons for the Americans. Very large cargo helicopters, such as the Boeing CH-47 Chinook and the Sikorsky HH-3 Jolly Green Giant, also changed modern warfare strategy.

The North Vietnam military also used utility and medium lift helicopters, in the form of the Soviet Mil Mi-1, Mi-4, and Mi-

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A helicopter war. Bell's UH-1 Iroquois, often called a Huey, played a large roll in troop mobility, medevac and ground attack in Vietnam. This example was left behind, and is today on top of the presidential palace in Ho Chi Minh City.

AIRWOLFHOUND / WIKIMEDIA COMMONS

ALAN WILSON / WIKIMEDIA COMMONS

MIDDLE: Westland's Wessex heavy lifter proved itself in the SAR and utility roles.

ABOVE: Cierva produced several models of their rotary aircraft. This C.30, now in a museum, served with the Royal Air Force.

8. Elsewhere around the world, manufacturers were churning out helicopters of different size, roles and configurations, including Westland, Sud, Bolkow, Agusta, Kawasaki, PZL, Kamov, and Bristol.

In Australia, the Army had also started operating light helicopters (the Sioux), which were replaced by the Bell Kiowa. By 1975, the air force was operating UH-1B and UH-1H Iroquois and CH-47 Chinook, and the Navy were operating Iroquois, Westland Scout, and Westland Wessex helos.

Helicopters in civil use

For a decade, most of the world's helicopter production capacity had been consumed entirely by the military, but as production scaled up, civil use opened up. The Bell 47 was the first certified civil helicopter, but the floodgates opened immediately after. Sikorsky, who had the first mass-produced helicopter in 1943, the R-4, followed with the four-seat S-51 Dragonfly, and followed up with the S-55 (later licence-produced as the Westland Whirlwind) and the S-58 (aka Westland Wessex). The Hiller UH12 had the longest production run (albeit sporadic) from 1948 to 1994.

Before long, helicopters were being used for transport from airports to CBDs, search and rescue, air ambulance, policing, TV reporting, sightseeing, and joy flights. Booms were fitted for agricultural work. Their ability to operate from clearings as small as a tennis court meant they could be used for point-to-point transport of people or cargo, drug-running, mob revenge murders, prison escapes, and powerline inspection.

In Australia, the first civil helicopter was a Bristol Sycamore (operated by Ansett ANA), followed by a Hiller 12C (operated by TAA).

The first turbine helicopter in production was the Sud Aviation Alouette II, and the lighter weight and greater power of turbine engines expanded the opportunities for rotorcraft. Huge, heavy-lift helicopters like the Sikorsky Skycrane allowed helicopters to be used in construction and forestry, for off-shore oil rig work, and later for fire-fighting.

Corporate and personal helicopters became a possibility too, as production costs reduced. The Bell 206 Jet Ranger, and the Hughes 500 supplemented the fleet of piston Bell 47, Entrom, Hughes 300 and Hiller machines.

In more recent years, the Robinson R22 and R44 and Guimbal Cabri helicopters opened the market further. These aircraft are low-cost, lightweight machines, powered by familiar Lycoming O-320, O-360 and O-540 engines. In Australia, they have become popular mustering and agricultural aircraft. Amateur-built or kit helicopters were another lower-cost option. It may be surprising to discover that there are 54 amateur-built Rotorway helicopters on the Australian register.

In Europe, mergers and consolidation of the helicopter industry has resulted in two giants: Airbus Helicopters (Messerschmitt-Bölkow-Blohm and Aerospatiale) and Leonardo

(Agusta and Westland). This is not dissimilar to the United States, where Bell and Sikorsky dominate the market.

Two engines

Helicopters are particularly vulnerable to engine loss, and the solution came in twin-engine design. The two engines are coupled to the same rotor shaft. By the 1960s, twin-turbine was becoming the default for anything other than light helicopters. The early single-turbine designs were upgraded to twins, such as the Bell 205 which was reworked into the Bell 212 Twin Huey. And if two is better than one, three is even better. The Sud Super Frelon was powered by three Turbomeca turbine engines of 1550 shp each!

Twin rotors

The conventional configuration of main rotor and small tail rotor has dominated helicopter design, but there have been other successful approaches to countering the torque of the heavy rotating aerofoil.

Nikolai Kamov was a Russian engineer whose early work in the 1930s was in gyrocopter design. His 1947 Ka-8 single-seat helicopter broke the trend by using two coaxial contra-rotating main rotors. This design approach carried over into Kamov's other designs right through to the Ka-52 and Ka-226 helicopters 70 years later. Most well-known is the Ka-26, powered by two Vedeneyev M14P radial engines (as used in the Yak-52), with the engines mounted externally on nacelles. Over 800 Ka-26s were produced from 1968 to 1985.

Kamov were not the only proponents of contra-rotating rotors. The similarly named Kaman helicopters used a similar idea, with two "synchro-meshing" on separate masts. Charles Kaman, a pioneer in helicopter and musical instrument design, founded Kaman Corporation in 1947. Kaman created the first turbine-powered helicopter, the first electric VTOL drone (1953), and one of the first experimental tip-jet helicopters (where the rotors were revolved through compressed air routed through the rotor blades). The most well-known Kaman is the H-43 Huskie, which set an altitude record of 33,000 feet in 1961.

Another twin rotor approach is exemplified by the Chinook, which has front and rear intermeshing rotors, both powered by two Lycoming T-55 turboshaft engines. The tandem rotor layout had been pioneered by the Piasecki H-21 "Flying Banana". After a falling out with the founder, Frank Piasecki, the company re-branded

A McDonnell Douglas NOTAR rigged for crop spraying in New Zealand.

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LEFT: Often called the MASH helicopter, the Bell 47 pioneered medevac during the Korean War. This one is in service with Airwork Helicopters at Caboolture.

BELOW: Gyrocopters are still a popular sports rotorcraft.

as the Vertol company, and was acquired by Boeing in 1960. The tandem designs were dominated by the CH-46 Chinook and CH-47 Sea Knight.

NOTAR

Another approach to counter torque was the NOTAR "no tail rotor" concept, which was pioneered by Hughes helicopters. It involves a fuselage mounted fan running air through the hollow tail boom to vents on the right side of the boom. This layout has advantages of safety (no vulnerable tail rotor) and lower noise. Hughes, now McDonnell Douglas, continues to produce NOTAR helicopters such as the MD-900 Explorer.

Aerospatiale pioneered another tail innovation: the fenestron tail rotor fairing, a housing which reduces sound levels and reduces the risk of people walking into the tail rotor on the ground.

The big Russians

We view everything through a cultural lens, so when readers of *Australian Flying* think of the most produced helicopter, we will typically guess the Iroquois or the JetRanger. In fact, it's the Mil Mi-8. A handful of this type have visited Australia, some New Zealand and some New Guinea registered. But 17,000 (so far) of this type have been built from 1961 to the present day.

The Mi-8 is a twin-engined turbine single-rotor medium lift helicopter with a payload of three to four tonnes. It can carry 28 passengers over 350 miles, and was designed by Mikhail Mil, founder of the Mil Moscow Helicopter Plant.

The Chernobyl nuclear power plant disaster brought the big Mil helicopters into the public eye, as news footage documented the brave efforts of crews to seal the cracked reactor. The operation involved five different Mil helicopter types: Mi-2, Mi-6,

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Mi-8, Mi-24 and Mi-26. Forty helicopters (30 Mi-24s and 10 Mi-8s) flew the bulk of the dangerous missions, and one Mi-8 crashed after colliding with a crane.

After the operation, all helicopters involved were buried due to radiation contamination.

Australian rotorcraft

Unlike most other fields of aviation, Australians didn't play a big role in the development of the helicopter. There are some exceptions, though. In 1948, Eric Adney built a tiny single-seat helicopter powered by a 20-hp motorcycle engine. Geoffrey Wikner started building his Wikopter (powered by a Gipsy Major engine) in 1960, which eventually flew in 1970. Duan Phillips designed a two-seat helicopter powered by a Rolls Royce Continental O-300 engine in the late 1960s. The prototype Phillicopter flew in 1971, but it took until 1984 for the type certification to be granted by CASA. The production version was to be fitted with a Lycoming O-290, but none were completed, despite many efforts up until the mid-2010s.

Victa Aviation went a fair way down the path to producing a two-seat gyrocopter, known as the Victa R-101 Gyroplane. The prototype flew in 1961, but development ceased in 1964 so the company could concentrate on the Airtourer and Aircruiser types. Of course, Commonwealth Aircraft Corporation was also part of the story. The CA-32 Kiowa was a licence-produced Bell 206 manufactured at Fishermen's Bend in Melbourne. CAC built 44 Kiowas for the Australian Army and Navy from 1973 to 1977.

Gyro renaissance

Although gyrocopters (or autogiros or gyroplanes) never reached the same mainstream adoption as helicopters, they have always had a strong attraction in recreational flying. For many years, homebuilt (and often self-designed) were the only option for gyro pilots. Volkswagen-powered single-seat gyrocopters ended up with a poor reputation for safety, and were often banished from airfields. Over time, Rotax and Subaru powered machines helped improve safety and reliability standards, but the big change in recent years was the arrival of high quality factory-built machines.

In Australia, the Australian Sport Rotorcraft Association (ASRA) administers sport gyroplanes through the certification of pilots and the listing of gyroplanes in Australia. It is claimed that gyros are the fastest-growing form of recreational aviation, and there are over a dozen manufacturers around the world, including Magni (Italy), ELA (Spain) and AutoGyro (Germany).

The military re-use of gyros has been revisited, in particular by China, whose PLAY now operate two- and three-seat strike gyrocopters with anti-tank missiles. The People's Armed Police (PAP) have also introduced gyrocopters for aerial surveillance and rapid response.

Rotors rule!

In the century or more since the first craft with a rotary wing took to the skies, the invention has become one of humanity's greatest engineering advances. The convergence of rotary wing technology, electric power systems and computerised flight control systems will ensure that the helicopter, quadcopter, drone, gyroplane, eVTOL, flying car, or whatever we decide to call them will continue to play an important part in society for at least another century.

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Rotors

Airbus flies SAF-fueled H130 in Australia

Dave Soderstrom *presents news and views from the Australian helicopter industry.*

POWERED BY SAF
SAF

Airbus Helicopters announced at the Australian International Airshow that it had completed the first flight in Australia of a helicopter fueled with sustainable aviation fuel (SAF).

The flight, a joint operation with Moorabbin operator Microflite and engine manufacturer Safran, was done with an Airbus H130 fueled with 200 litres of jet fuel, a blend of 40% SAF and Jet-A1 powering the Arriel 2D engine.

The fuel was supplied into Australia by Neste, marking the first shipment of its kind into this country.

“The use of SAF is one of Airbus’ levers to reduce carbon emissions, and we are proud to have achieved this milestone SAF flight with long-standing partners Safran and Microflite,” said Stephen Forshaw, Airbus Chief Representative for Australia, New Zealand and the Pacific.

“This demonstration flight underscores Airbus’ commitment to help our customers achieve more sustainable operations. It is an important step in our journey towards decarbonisation, as we join like-minded industry partners for a wider adoption of SAF in flights.”

Microflite Chief Operating Officer Rodney Higgins said his company had an agenda to reduce carbon emissions and was proud of their involvement in the flight.

“As a young and dynamic aviation company with a strong vision to lead excellence in sustainable aviation, we have a fleet of over 20 aircraft conducting passenger, aerial work, and emergency services operations," he said,

"Our 10-year strategy is to transition our entire fleet to either SAF or electrically powered flight. This Australian-first use of SAF in a rotary-wing aircraft has been achieved through a collaboration with our valued industry partners, and Microflite is proud of the commitment from Airbus, Safran and Neste to join us in leading a sustainable aviation industry."

New operators adopt Helitak

Kestrel Aviation and Arc Helicopters have joined a growing list of operators both locally and internationally operating the Australian designed and manufactured Helitak FT4500 collapsible belly tank.

Kestrel fitted the belly tank to UH-60A Firehawk N12FH, with the the tank and helicopter combination flight-tested prior to the machine departing and taking up its contract to the Victorian Government based at Ballarat Airport. This is the helicopter's first contracted season since its arrival in Australia.

Helitak 367, as it is known in Victoria, is the first Firehawk contracted by the Victorian Government and joins United Aero and Touchdown Helicopters as local operators of the tank on Black Hawks.

Moorabbin-based ARC Helicopters has fitted a Helitak tank to EC225LP Super Puma VH-HGM. Now fitted out for firefighting operations which includes the edition of the Helitak FT4250 tank with a capacity of 4250 litres, ARC has now added the machine to the NAFC register as Helitak 477, named *Winifred* in honour of founder Tim Chibs’ mother.

Chibs said that he is now in discussion with several states and territories in Australia for the machine's use, not only for aerial firefighting, but also search and rescue and flood operations.

Reference was also made to the machines capabilities in terms of passenger carrying, load lifting endurance among its many versatile roles the EC255LP Super Puma is capable of doing.

During Avalon the machine was exhibited with a Helitak tank mocked up underneath the airframe showing how the Puma would look once the tank is installed.

Microflite's SAF-fueled H130 waits on pad 5 at Avalon 2023.

> **"Their versatility and readiness ... also aid us in delivering tailor-made aviation solutions to our clients."**

Leonardo secures Australian order for six AW139s

Announced at the Avalon Airshow, Leonardo confirmed that six more of their AW139 twin engine helicopter would be added to Australian operators fleets in 2024. The orders came from Babcock (2) RACQ CQ Rescue (2) and Starflight (2). All existing operators of the type.

Babcock Australasia will take two for HEMS, Search and Rescue and inter-hospital patient transport missions on behalf of an undisclosed client. All six helicopters will be delivered From the Vergiate, Italy, production facility in 2024.

The two AW139 platforms ordered by CQ Rescue will be used in the Mackay region of Central Queensland to perform both on-shore and off-shore EMS/SAR missions day and night and in most weather conditions.

The two for Starflight Australia will be operated in Queensland and other parts of Australia, carrying out EMS/SAR missions in both on shore and off shore capacities. The order will bring the total of AW139s operated by the StarFlight and LifeFlight groups to 15, nine of which are dedicated to EMS/SAR missions.

StarFlight Australia CEO and Director, Ashley van de Velde, says: "StarFlight Australia is pleased to have finalised the purchase of two new AW139 helicopters which will be utilised for future work.

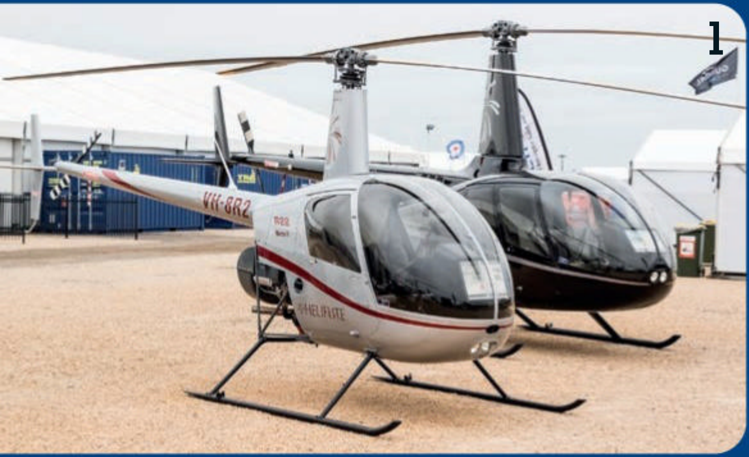
"We already operate a number of these aircraft in our fleet and are constantly impressed with their reliability, quality, and serviceability. The features, technology, size, and all-round advanced capabilities [that] the AW139s offer, make these aircraft ideal for our requirements.

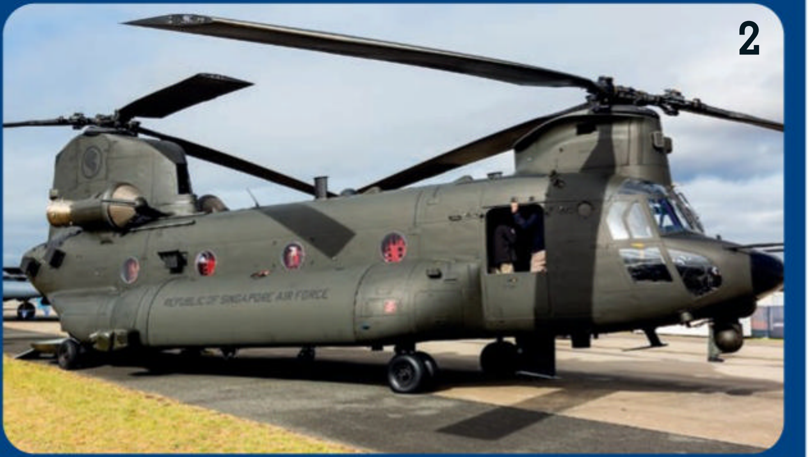
"Their versatility and readiness for various configurations also aid us in delivering tailor-made aviation solutions to our clients."

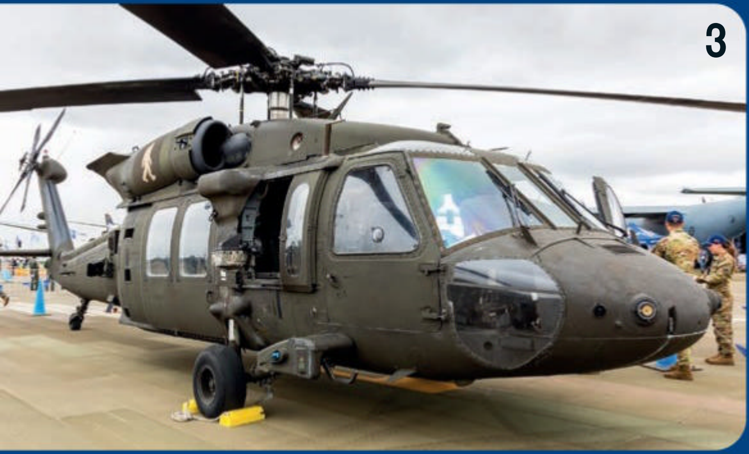
Toll Helicopters orders more AW139s

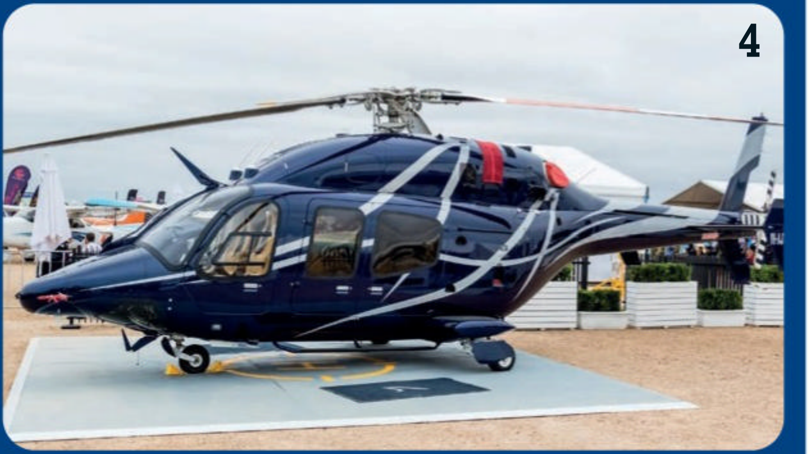
Toll Helicopters has again returned to Leonardo to further increase its fleet of the AW139. These new machines will supplement a fleet of three AW139s already currently supporting a range of activities

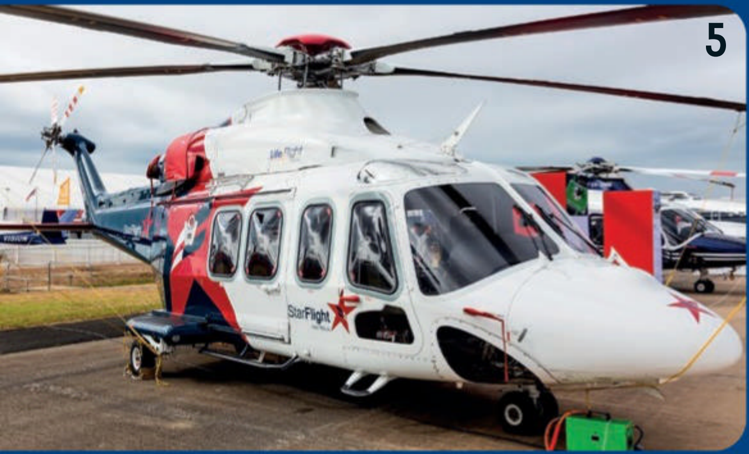
Avalon Helicopter Gallery

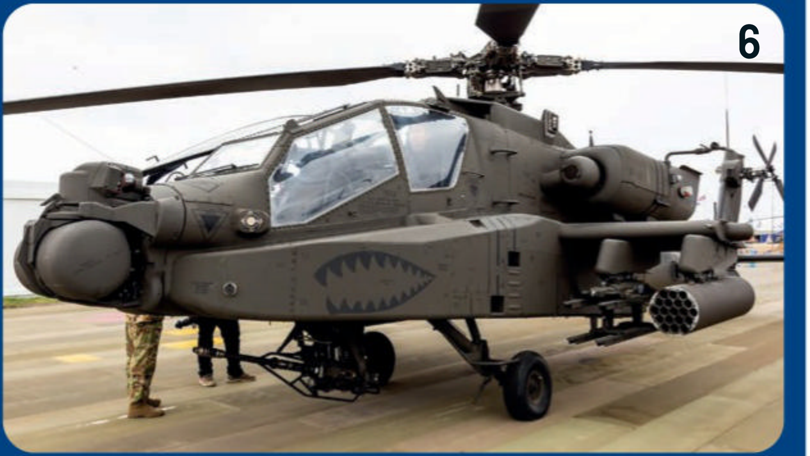












1. This Heliflite R22 attracted a lot of attention as it sported one of the new alpha-numeric registration numbers that CASA introduced last year.
2. A Singapore Air Force "Chook" was on display at Avalon 2023.
3. A United States Army Black Hawk open for inspection.
4. This Bell 429 was featured in the rotary section of Avalon 2023.
5. A LifeFlight/StarFlight AW 139. The organisation has announced they will acquire two more of the type for HEMS and SAR operations.
6. A US Army Apache at Avalon. The type is set to enter service with the Australian Army as a replacement for the ARH Tigers.

including pilot and aircrew officer training, utility support to ADF exercises and emergency response and disaster relief missions.

The new Helicopters will delivered from Leonardo's Vergiate final assembly line facility in the second half of 2023 and bring Toll's fleet of AW139's to a total of 12. Toll Helicopters contract delivery is across two programs, a crash response helicopter service for the 1st Aviation Regiment in Darwin, and the Army Commercial Helicopter program currently based out of the 5th Aviation Regiment in Townsville.

The aircraft features searchlight, hoist, cargo hook, provisions for EO/IR equipment, to support a range of training and emergency response and disaster relief missions.

LEFT: Robinson's ubiquitous R44 has been the backbone of the company over its 50 years in operation.

BELOW: ARC Helicopters' EC225 Super Puma with a mock-up Helitak belly tank at Avalon 2023.

Robinson to celebrate 50 Years in 2023

Robinson Helicopters, one of the leading helicopter manufacturers around the globe, will celebrate its 50th anniversary in June.

Founded by Frank Robinson on 20 June 1973, Robinson's set out to design and manufacture simple, reliable helicopters.

Robinson's simple two-place R22 was FAA type-certified in 1979, marking the beginning of a new generation of helicopters designed to make flight training and private helicopter ownership more affordable. By 1988, the R22 was the world's top-selling civilian helicopter.

Robinson introduced the four-place R44 in the '90s, after the company realised the potential for a light mid-size helicopter. Today, the R44 in is the top-selling civil helicopter in the market. Robinson shipped 142 R44s in Cadet, Raven I and Raven II versions in 2022, compared with 129 Airbus H125/M and 83 Bell 505s.

In 2010, Robinson once again expanded its line with the five-place, turbine-powered R66. The R66 is now the company flagship, having been designed using the same template as the R22 and R44, but with increased capacity, improved high-altitude performance and is powered by readily available jet fuel.

In 2022, sales of the R66 (101) surpassed those of the popular R44 Raven II (86).

Sadly, founder Frank Robinson didn't live to see the significant 50-year milestone, dying at the age of 92 in November last year.

Today the company is run by Frank's son Kurt Robinson, and now boasts a world-wide fleet of 13,000 airframes.

Sikorsky logs a Century in Operation

Sikorsky Helicopters is celebrating 100 years as a company this year. Ukrainian emigre Igor Sikorsky founded the company in 1923 on a chicken farm in Long Island, USA. Originally, Sikorsky designed the fixed-wing S-29A and concentrated on amphibians and flying boats.

After moving to Connecticut in 1929, Sikorsky revisited an idea he has as early as 1908: to design a flying machine that would take off and land with no vertical speed. Previous ideas had been hampered by the lack of an engine suitable enough and powerful enough.

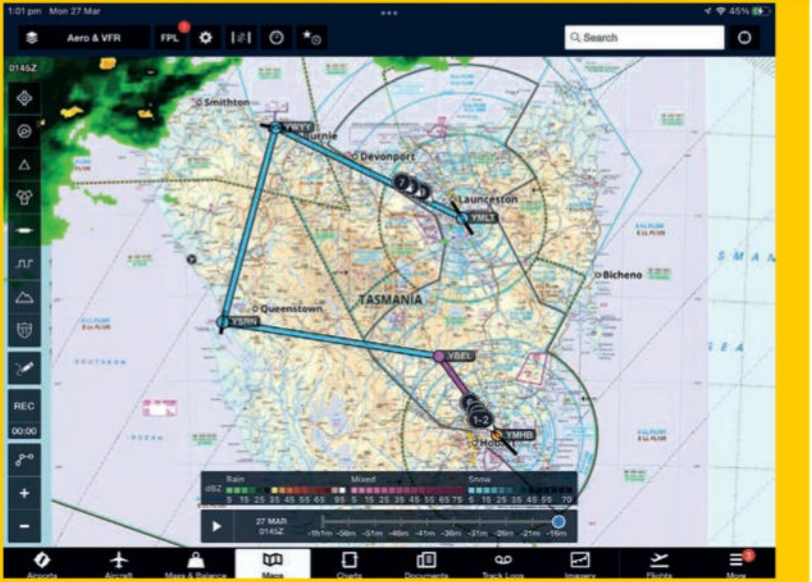
Sikorsky built seaplanes by day, and by night he returned home where he would disappear into his office.

"It was there that the first sketches for what would become the VS-300 appeared," said eldest son Sergei Sikorsky, "and I would sneak in there once in a while and watch Dad either calculating or sketching the very first helicopter."

What Sikorsky was working on was the VS-300, which he patented in 1935 as a Direct Lift Aircraft. It flew for the first time on 14 September 1939 for 10 seconds. It was the first of a long line of helicopters that changed aviation and the world forever.

"Igor Sikorsky demonstrated a passion for innovation and the grit to see his vision through to fruition," said Paul Lemmo, Sikorsky President. "For 100 years, our employees have carried on the culture of innovation he started as we help customers around the world perform difficult and sometimes dangerous missions."

Today, Sikorsky is a Lockheed Martin company and produces military and civil helicopters such as the Black Hawk and Sea Hawk range, and the S-76 14-seat commercial helicopter, with other innovative airframes at various stages of development, such as the SB-1 Defiant.



ForeFlight for Australia

The world's most popular EFB is now Downunder and brings a new face to the market.

When you're the fourth product to enter a saturated market, you need your stuff to pack a bigger wallop that the other three to get your share. ForeFlight is the fourth electronic flight bag (EFB) to enter the Australian market behind OzRunways, AvPlan and Garmin Pilot, but it just may have the goods to make an impact here.

Foreflight is the most popular EFB in the world, but until now has not bothered with the Australian and NZ market. We are small, but they are large. Now the Boeing-owned company has CASA approval as a supplier of aviation documents, Foreflight is knocking on doors looking for converts.

Their arguments are compelling. Foreflight is the most graphically-slick and feature-packed EFB of the lot.

Like other EFBs, ForeFlight presents you with a chart of your choosing and a field to punch in waypoints to plan your flight. That can be done using waypoint identifiers or tapping the chart and selecting from a menu of nearby options. The EFB then shows you your route overlaid on the chart. All of that is familiar to most EFB users.

But in ForeFlight, you can choose what overlays (or objects) you want to see on the chart from a icon menu on the left: airports, CTA, obstacles, airways routes and others. There's also a very handy scratch pad function that enables pilots to make notes on the actual chart rather than in a different screen.

> **"Foreflight is the most graphically-slick and feature-packed EFB of the lot."**

And when you zoom in on the chart, the display overlays a scaled airfield diagram. You can also view the airfield surrounds in a 3D satellite type image to give you a visual of what you can expect at any time in the flight. That function also enables you to run the flight on a 3D screen that shows your relationship in time and space against the terrain you're flying over.

The strip menu across the bottom of the screen, like others, is the place where most of your flight preparation is done, but you can choose what functions you want on the menu and re-order them to suit yourself.

This, plus W&B, aircraft profiles, access to documents, procedures and flight profiles are the sorts of things that you expect from any EFB. Like air conditioning in a new car, if it's not standard don't buy it.

So what is ForeFlight's major offering? Jeppesen charts. IFR pilots thrive on Jepp charts and ForeFlight will bring those to the party with the right subscription. Coupled with all the other functions of IFR flight, an EFB like this one is a great complement in the cockpit.

But, as always, there are some downsides. The least of these is that there is a lot of un-learning to do if you're coming from OzRunways or AvPlan. ForeFlight operates in different ways, and the first few attempts may cause confusion and frustration. As an example, ForeFlight deals with flight plans and flights as separate creatures. You can plan, but to make the plan into reality you need to save it as a flight. Once you clear the Plan field, the plan is gone, but the flight remains.

You'll also find a function called "Pack". This is not a suggestion that you take clean underpants and a toothbrush, but rather lists all the documents that you'll need for a journey and bundles them for easy access from the Flights page. Some understanding of this is needed.

The second is that ForeFlight doesn't present as well on a iPad mini as other EFBs. The text, particularly in the Navlog function can be too hard to read, especially if you're using readers and the iPad is sitting on your knee.

Regardless of the downsides (which are minor compared to the functionality), ForeFlight brings a brand new option to the EFB market and is rapidly gaining friends. Whether or not that is enough for this app to rise to the top of the tree remains to be seen.

ForeFlight by Boeing
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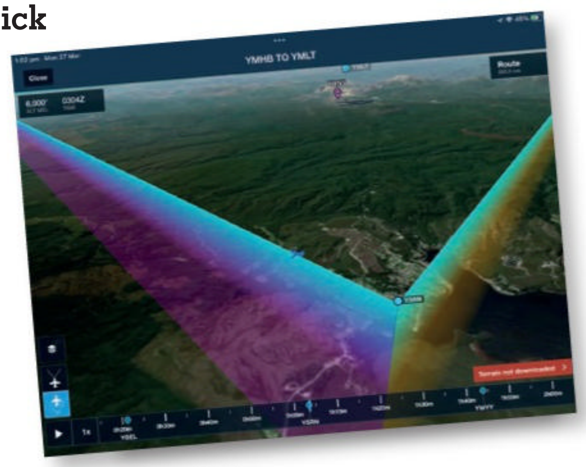

TOP: Differently familiar: ForeFlight operates similar to other EFBs, but there are some slick differences, such as the icon menu on the left.

RIGHT: A 3D functions shows you what any stage of your flight looks like relative to terrain.

Queen of the Skies

Jim Eames *has a new book on the Boeing 747 and the impact it had on Qantas and Australia.*

'Essential reading for every person who has an interest in aviation . . . Jim's knowledge, experience and insights put him in the captain's seat to explain how Boeing, the 747 and Qantas changed the world.'
Captain Richard de Crespigny AM, Pilot-in-Command and author of QF32
THE MIGHTY
747
AUSTRALIA'S QUEEN OF THE SKIES
JIM EAMES

Too many products are introduced with the label "game-changer" long before they have earned it. Many of them go on to be unworthy of the name. But if there is one thing that stands out as a genuine game-charger above all others, it is the Boeing 747. Saddled with the early nick-name "Jumbo Jet", the four-engined 747 revolutionised long-distance travel right around the world by carrying more people further than any commercial aeroplane before it.

That was truer for no other country more than Australia, this girt-by-sea continent isolated at the bottom of the world. Our national carrier, Qantas, leveraged the big Boeing perhaps more than other airlines, thanks to a need to throw off the shackles imposed by the tyranny of distance.

How that all came about is beautifully recounted in Jim Eames' new book *The Mighty 747: Australia's Queen of the Skies*. A former senior executive with Qantas, Eames delivers an insider's view of the decisions that drove the airline to adopt the 747 as its new flagship, and the impact that brought Australia closer to the rest of the world.

The yarn begins in the mid 1960s, when Qantas executives were tossing around a replacement for their 707s. Do they go with the larger 707-338, or fall for the temptation offered by the supersonic Concorde project?

And once the decision to go with the new Jumbo Jet was made, there was the issue of airports: neither Sydney nor Melbourne could accommodate the size of the 747. Rivalry to be the first to take a 747 started a race that ended with Mascot in Sydney being expanded and Melbourne opting to build a whole new airport at Tullamarine.

Sydney won, and on 15 August 1971, 747-200 VH-EBA City of Canberra touched down at Mascot. It was the beginning of Australia's long love affair with the big Boeing.

The Mighty 747 examines the type's impact on long-distance flights in Australia and delivers some ripping anecdotes about strange and amusing incidents from the long career of the B747 in flying kangaroo colours, from the first long-hauls to London to the retirement of the last of the line, Eames has caught every important moment in the history of an aircraft that has left a legacy like no other.

The Mighty 747 by Jim Eames
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Business booms at Avalon 2023

Jessica Graham, *CEO of the Australian Business Aviation Association, reports on the business aviation side of Avalon 2023.*

A successful and sold-out Avalon air show served to remined the Australian business aviation community of the importance of these events for our industry. Several international business jet OEMs made the trip with their newest aircraft, ensuring business jets were well-represented on static display and within the exhibition halls.

Avalon reported a record attendance for the trade days of the show, with numbers up by 24% from 2019. According to Justin Giddings, CEO of show organiser AMDA Foundation, "From the first minute of this Avalon there was a dynamism in the exhibition halls and the sense that a lot of people were having some very productive conversations.”

> « the show also provided an opportunity for business aviation attendees to explore recent developments »

A number of business aviation organisations successfully leveraged the show week to re-connect with industry and create further business opportunity. Events held by Execujet MRO, JetCraft and newest ABAA operating member ACAM Pacific were well attended and helped imbue the week with a feeling of conviviality and global community.

Importantly, after a four-year hiatus, the show also provided an opportunity for business aviation attendees to explore recent developments in emerging technologies and future energy solutions.

ABAA member Air BP held a standing-room only briefing on sustainable aviation fuels with Asia Pacific Regional Commercial Director Ajay Galdhar presenting on the company’s vision for to help achieve aviation’s goal of net zero carbon emissions by 2050.

While other initiatives are also key to meeting this target, ensuring the reliable availability and governance of affordable and SAF presents as the industry’s most immediate pathway in the short to medium term.

Peer support seminar

Supported by associate member sponsor Medaire, the ABAA held a members’ seminar at the show. Titled Peer Support and Mental Wellbeing; a Conversation for Business Aviation, 2023 & Beyond, members were joined by peer support specialist Chris Smith, founder of Navigating Aviation Angela Garvey and CASA Senior Medical Officer Dr Sanjiv Sharma to begin discussion on this challenging subject.

While commercial airlines have successfully implemented Peer Support and Employee Assistance Programs over many years, translating these to our general and business aviation can sometimes seem to present too big a challenge. At the same time, the segment often places high demands on its people, and, despite the inherent barriers, member organisations were united in their goal to provide improved support of employee mental wellbeing.

Having successfully designed and implemented peer support within a range of airlines and organisational cultures, Chris Smith provided valuable insight into how such programs may be scaled and transferred to smaller organisations with relatively low cost and significant benefit.

In sharing her own story, Angela Garvey highlighted the importance of ensuring access to appropriate support and care for

TOP TO BOTTOM: The latest model of business jets were featured in the external exhibition spaces.

The ABAA panel at Avalon proved very popular with members.

VH-FWA
M500
Piper
AIRFLITE

Falcon 8X
DASSAULT AVIATION

STEVE HITCHEN

AVALON 2023
AUSTRALIAN INTERNATIONAL AIRSHOW
AEROSPACE AND DEFENCE EXPOSITION

KAITLYN COSTA

the general aviation community, both in the aftermath of a serious incident or accident and in the management of day-to-day stress and work-related pressures.

Of course, the topic of medical certification can be difficult to negotiate in this context. Members were encouraged by the pragmatic yet sensitive perspective provided by CASA's Dr Sanjiv Sharma who presented on the salutogenic approach to managing mental health.

The topic is an important one for ABAA members, and while we cannot be naïve about the challenges, the drive to implement solutions is gaining momentum. If we consider taking a collaborative approach, there is potential for us to work collectively towards a more resilient business aviation community for the years ahead.

Aviation white paper

The ABAA welcomed the invitation to participate in the consultation process for the current government's first aviation white paper, noting the specific inclusion of support and regeneration of the general aviation sector within its terms of reference.

Australian business jet operators support a wide range of industries from mining & resources, to logistics, manufacturing, and agriculture. They also provide direct and downstream economic benefit via domestic and international charter, as well as providing time-critical medical transportation.

On behalf of its operating members, the ABAA submissions will prioritise issues such as technical skills shortages, equitable access to airports, airspace and infrastructure, and initiatives to drive and guide the integration of new technology capabilities and sustainable fuel alternatives. It will also come together with other industry bodies to support the inclusion of the needs of general and business aviation in the development of strategic aviation policy.

Ts and Ps in the Green for RAAus

RAAus CEO **Matt Bouttell** *says the bouyant mood at Avalon 2023 and the new Strategic Plan have his organisation ready to apply full throttle.*

The RAAus tent was a busy spot for most of the six days of Avalon 2023.

STEVE HITCHEN

I'm writing this article on the day after I arrived home from Avalon. With sore legs, a hoarse voice and a spike in optimism for, not only Recreational Aviation Australia (RAAus), but our industry more broadly, our team has had a terrific week at the Australian International Airshow. With four years since the last air show, there really seems to be renewed enthusiasm.

RAAus had a large presence at Avalon 23, as we've done in previous years. This year we also had more members fly their aircraft in than ever before. The aircraft were on show to the thousands of attendees, sowing the seed for many conversations around recreational aviation, building aircraft and "how do I get into this?" It was terrific to see the diversity of aircraft, from amateur built, light sport, type-certified, powered parachutes and weight-shift microlights.

It was also so pleasing to have the large number of girls and women come up to our team to ask how they can become a pilot or maintainer. The excitement in their voices and glint in their eye reminded me very much of how I felt during the Bicentenary Airshow at Richmond in 1988. But this was different, these were girls and women wanting to join our industry and knowing that it's a genuine option for them.

For those that attended the RAAus marquee on a few of the days, they may have had the opportunity to meet Catriona Rowntree who, with support from RAAus, recently completed her RPC. Catriona's journey was part of a broader program called Touch the Sky (touchthesky.au) which is a documentary series that follows several women overcoming barriers and getting to where they want to be: flying.

It can't be overstated that to broaden the appeal of our industry that we need role models for girls and women to aspire to, and the women in Touch the Sky do this with aplomb. As Catriona said on numerous occasions throughout her own journey, "if you can't see it, you can't be it!"

All of this recent activity at Avalon coincides with the release of the RAAus 2023-25 Strategic Plan. This plan aims to benefit RAAus members not only for the duration of the plan but also for the years beyond. Importantly, it also aims to incentivise those that may have given up on their dreams of aviating, for whatever reason, and give it another go through RAAus.

RAAus is an important part of the broader sector, with a fleet of aircraft that is about 27% the size of the CASA registered fleet (for aircraft <5700 kg MTOW) and it's for this reason we take our role seriously in promoting the industry in a positive way so that the whole industry and participants benefit.

> « we take our role seriously in promoting the industry »

The new Strategic Plan outlines, at a high level, the areas we will be focusing on and why, by articulating seven specific objectives:

- retain existing members and grow traditional base
- increasing members diversity
- administer new technology
- develop educational pathways
- increase and diversify income sources
- establish and implement a marketing strategy for the organisation, and
- embed enterprise risk management framework across the organisation.

For aviation to prosper in Australia we each need to do our bit to grow, promote and be optimistic about not only our own sector, but the rest of the industry too. This is embedded in RAAus psyche and is the object of our company within our constitution. These objectives will advance aviation in Australia, and encourage aviation training. They are not constrained by focusing just on RAAus, but they take a liberal approach for the greater good too. It's something we take seriously.

So when I reflect on Avalon 23, I'm proud that we've played our small part to inspire and connect many people to aviation. And importantly, this isn't a one-off as our Strategic Plan aims to continue in this spirit so the next generations have a prosperous industry too.

Revisiting Principles

*CASA Director of Aviation Safety **Pip Spence** says its time to review the decade-old regulatory philosophy.*

It's not quite a decade since CASA responded to criticism about its relationship with industry by introducing a new regulatory philosophy.

The philosophy was designed to underpin the way we performed our functions, exercised our power and engaged with the aviation community.

It laid out 10 principles aimed at improving the way we worked with industry and forming a basis for mutual understanding and respect.

The CASA senior leadership team, with the support of the Aviation Safety Advisory Panel, has recently been revisiting that regulatory philosophy and discussing whether it still does the job and, more importantly, whether we are adhering to it.

This kind of review is something any government agency or business should do on a regular basis and our conclusion was the principles embodied in the regulatory philosophy still stood the test of time.

Those principles commit us to:

- maintaining the trust and respect of the aviation community
- being mindful of the primacy of air safety but taking into account all relevant considerations, including cost
- taking risk-based approaches to regulatory action and decision-making
- performing our functions consistently with Australia's international obligations
- approaching our regulatory functions consultatively and collaboratively
- communicating fully and meaningfully with all relevant stakeholders
- fairly balancing the need for consistency with the need for flexibility
- embracing and employing rational 'just culture' principles in our regulatory and related actions
- demonstrating proportionality and discretion in regulatory decision-making and exercising our powers in accordance with the principles of procedural fairness and natural justice
- taking a limited but legitimate role in pursuing punitive action for breaches of the civil aviation legislation.

It's one thing to have a set of principles but, as we all know, we also need to apply them.

We're looking at what sort of regulator we want to be and how we can make sure we embed the regulatory philosophy in our day-to-day activities.

We want the principles to drive what we do each day and how we interact with our partners in the industry.

Safety is still our prime responsibility, but we need to ensure our decisions are evidence- and risk-based. We also need to make sure we are transparent in our decision making and outcome-based.

Our approach should be driven by the best information and not place unnecessary burdens on industry.

We are already taking steps to boost engagement by translating legally complex legislation into simple language through our Plain English Guides.

We continue to work on making CASA services consistent and standardised but you can still take straightforward requests to our local staff.

We're embracing digital technology and while this has not been without its hiccups, it will make dealing with us quicker and easier.

In terms of collaboration, we've put considerable effort into supporting the bedrock of Australian aviation with our General Aviation Workplan after listening to your views on what changes were needed.

> « We're looking at what sort of regulator we want to be »

When something hasn't worked the way we expected, we've endeavoured to be flexible – as was the case recently with the deferred provisions of the flight operation rules.

We've also tried to help people understand why a timeframe has slipped or we're not proceeding with an initiative.

We want to build trust and respect in the aviation community – without compromising safety – so we can work together to foster a vibrant Australian aviation industry.

The COVID pandemic now seems largely behind us and despite continuing economic headwinds, now is a time for all of us to get together and talk about the future.

We're having this important conversation at CASA and we would like you to join us.

CASA recently deferred some of the flight operations rules, which Pip Spence says shows a desire to be flexible.

JIM DAVIS

Jim Davis has 15,000 hours of immensely varied flying experience, including 10,000 hours civil and military flying instruction. He is an established author, his current projects being an instructors' manual and a collection of Air Accident analyses, called 'Choose not to Crash'.

Fuel Pump not Found

CAA AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

This discussion contains extracts from the SACAA's accident report. It is compiled in the interest of promoting aviation safety and not to establish legal liability.

Aircraft registration: ZS-FPJ
Date and time of accident: 19 June 2015 1602Z
Type of aircraft: Cessna C210J
Type of operation: Part 91
PIC license type: Commercial
License valid: Yes
PIC age: 38
PIC total hours: 6400
PIC hours on type: 149
Last point of departure: Piesangshoek
Next intended landing: Nelspruit
Location of accident site: Field near EAQB
Meteorological information: Wind 090/08, viz 10 km. temp +18C
POB: 1+0
People injured: 1
People killed: 0

HISTORY OF FLIGHT

The engine started without difficulty and the pilot waited until all the engine instruments were normal before taxiing in an easterly direction for a westerly departure. He carried out his take-off checks. At 1900 RPM he noted that both magneto drops were 50 RPM.

The pilot selected 10° of flaps and took power. The aircraft accelerated downhill towards the west with a 15 kmh tailwind. The pilot reported that during the climb, at about 100 ft AGL he noticed a gradual loss of power and the aircraft was unable to gain altitude. The RPM surged between 2500 and 2200.

The pilot stated his eyes were outside the cockpit and he did not consider looking inside, to operate the electric fuel booster pump as the aircraft was drifting towards the tree tops. *(Jim's note: but he was able to notice how much the revs were surging.)*

During a turn to the right, he lost control. The right wing dropped and the aircraft entered a near vertical descent, colliding with tree stumps on an uphill slope before impacting the ground.

A fierce fire broke out, which ultimately destroyed the aircraft. The pilot unbuckled himself and vacated the burning wreckage through the right-hand door. He sustained minor bruises to his left hand. The farmers in the area drove to the site and assisted with supressing the fire.

The first witness, a farmer who was at the airstrip, took a video of the aircraft during take-off. The aircraft rotated right at the far end of the runway before climbing and disappearing from his view. The aircraft flight profile on the video clip showed that towards the end of the runway, after rotation, the aircraft had a high nose attitude and the wings were level.

The engine-driven fuel pump was inspected and was found to have a sheared drive pin, P/N 631684, caused by the pump seizure, with a consequent fuel starvation and loss of engine power. When the pump was actuated by hand, there was no movement or continuity to its mechanical linkage that connected into the engine. The primary reason for the fuel pump seizure could not be determined.

Though the engine-driven fuel pump is the primary source of fuel pressure to the engine/ injectors, the aircraft also had a back-up auxiliary electric fuel "boost-pump, redundancy system" installed on it. In case the engine-driven pump fails or is unable to maintain adequate fuel flow, the auxiliary fuel pump must be instantly turned on. It is controlled by a switch on the instrument panel.

The pilot admitted than he did not monitor the fuel flow during take-off and at no time did he think of turning on the auxiliary fuel pump.

The POH states that if the engine-driven fuel pump fails during take-off, the pilot should immediately hold the left half of the auxiliary fuel pump switch in the HI position until the aircraft is well clear of obstacles.

The pilot was experienced and familiar with the type of aircraft and well aware of all the emergency procedures. The investigation concluded that the pilot failed to conform to the POH emergency procedure which would have kept the engine running.

Aiming to make safer pilots of us, here veteran instructor Jim Davis looks at extracts from official CAA Accident Reports from his homeland of South Africa and analyses why things went wrong and how we may all avoid making similar mistakes.

JAMES / FLICKRCC

> « Could it be part of today's instant gratification culture? »

What Can We Learn

1. Please RTFFM! (Read The Flight Manual)
2. With a fuel-injected engine it is critical to keep an eye on fuel flow during take-off. Any slight fluctuation, or decrease in pressure, calls for an immediate abort.

Jim's analysis

I find this incredibly depressing. Just going through my rather feeble recent memory, I can think of this Continental fuel pump issue killing people in two Bonanzas, a Baron, two 210s and a Piper Malibu.

What goes on in people's heads? Didn't they read the POH? Didn't they get a proper conversion? Don't they understand this very simple system? Can't they stick to the rules? Are they in such a hurry they don't think what they are doing? Do they think "it can't happen to me so I don't need to worry about it"?

The rule is pretty simple. You do *not* put the fuel pump on HI for take-off, or in flight, unless there is a problem.

I just don't get it. Actually that's a lie – perhaps I do get it. Could it be part of today's instant gratification culture?

When you get a new toy–an electric fan or a bit of furniture that needs to be assembled–do *not* read the instructions until you get stuck.

Yep – I'm guilty of this as well. I only pull out the handbook for my motorbike when I can't figure out how to reset the clock. Same with a Suzuki Swift I bought recently. What a magic little car that is, but I couldn't figure out how to make the aircon go from fresh air to recirculate air. I kept pushing the button until my son told me to slide it sideways. But read the handbook? No way.

But surely an aeroplane is different. There are a whole lot of apparently simple things, within easy reach, that can kill you if you don't understand them. The door locking mechanism, the seat adjustment, the control lock, the fuel cock ... even the park brake.

If you try to do aerobatics in a Chipmunk with the brake on you will not be able to recover from a spin. It's a very simple system, but if you don't understand it you will die.

Then there are more obscure things. Has the aircraft you normally fly got an alternate static source in the cockpit? Do the fuel caps have breathers? A family of four was recently killed in a Comanche because the pilot didn't understand the breathing system on the aircraft.

A mate of mine recently wanted me to fly with him in his little CTSW (hell, can't they give this delightful little aeroplane a proper name?). I insisted on reading the handbook from cover to cover before we even did a pre-flight.

Overkill? I don't think so. As a founder member of the LCC (the famous Live Cowards' Club) I don't want to be in the cockpit of an aeroplane that I don't understand.

KREISHA BALLANTYNE

Kreisha Ballantyne is one of the most recognisable aviation writers in Australia. With experience writing for several aviation titles, Kreisha has a broad base of experience, an ability to tap into important general aviation issues and a talent for expressing in simple terms what everyone is thinking. An active pilot, she lives and loves aviation.

A Reason to Fly

Kreisha Ballantyne *has some thinking to do as she prepares to re-boot her aviation career.*

In my last column, Confessions of a Lapsed Pilot, I declared I was going to set up a new, healthy habit: flying regularly.

After lamenting the paperwork, I proved the statement "when the weight of the paperwork equals the weight of the pilot, you're cleared to taxi." I purchased my printer to print out my 11-page driver's licence medical application form; I gathered together my documents across two states and I blew the dust off my logbook. I dug out my lucky flying shoes and booked a lesson at Lilydale.

A colleague and friend of mine is an instructor at my new training airport and had offered me a local scenic flight in his twin, to familiarise myself with the area. I scheduled a day off work, as he doesn't fly weekends, and began the Dance of the CAVOK.

Turns out, my dance only works with the Sydney weather gods. Clearly, Melbourne speaks another language entirely, as the weather on the day was so awful, I could barely see over the roof of the house opposite me. Being Welsh, I'm used to being disappointed by the weather – it rained for my entire childhood – but, somehow, being in Australia makes it unacceptable.

This was the fourth attempt my colleague and I had had to fly the local area and I was starting to think there was some invisible force deliberately preventing me from flying.

When I eventually came to my senses and remembered I'm a sensible atheist with no time for "invisible forces" or conspiracies, I accepted that my move to Melbourne was going to present more challenges than simply sharing a road with trams and working out what the hell a hook turn is. I accepted that aviation teaches patience, took a deep breath, and prepared for the week that was Avalon.

Well, reader, turns out if you can't fly, the next best thing is being among those who do.

Avalon 2023 was a corker. With all tickets sold out across the public days, and traffic hitting 45,000 over the trade days, it was clear that every man (and people of other genders) needed their av-fix as much as I did.

> « After two years of lockdown, I bathed in av-talk until I was fully sated »

I remember wondering, somewhere around the second COVID lock-down, whether life would ever return to normal; whether somehow we'd been inherently changed by the pandemic. I particularly pondered on how life would be for introverts post-pandemic, because for us our day had finally come.

As someone who was working from home long before it was cool, I was the first port of call for my poor extrovert friends in terms of advice: yes, it's perfectly acceptable to work from bed, yes pyjamas are counted as attire, yes a flight sim does count as flying. Pilots, largely being introverts (with some very notable exceptions) were possibly better equipped for the pandemic, except for the one obvious thing: being able to fly.

I wondered how many people, in various stages of learning to fly, walked away from their plans for a pilot's licence due to loss of momentum. I thought about all those people who were not introduced to aviation over the two years of lockdown; the intake of young people we never had, the retirees who took up golf instead, the planes not sold or bought due to borders being closed. I began to fret that GA may have taken a hit that would take years from which to recover.

But, thankfully, Avalon proved me wrong. Almost every person I have met over my 15-year adventure in aviation seemed to be there, from instructors of the past, old colleagues, members of every organisation I've ever joined, readers of this magazine, people I'd gone along part of my aviation journey with and then lost touch – it was a smorgasbord of all things aviation and I talked myself hoarse.

Because I was there in a work capacity, I didn't actually see any air displays, nor did I visit any static stands. This year Avalon was, for me, entirely about the people. And then it occurred to me: aviation has always been all about the people. Yes, of course I love to fly and there's nothing more awesome than nailing a perfect landing on the centreline, or starting your engine on a cold, crisp morning knowing that the lift is going to be splendid, or spotting your home aerodrome from 10 miles after a long trip (knowing exactly where the loos are).

But all those things are made 10 times better when you have a like-minded person to share them with. And that's how Avalon made me feel. After two years of lockdown, I bathed in av-talk until I was fully sated: I looked at

A colleague offered Kreisha a flight in his twin, but the weather was not as illustrated and continued to impede efforts. Maybe she needs to change her CAVOK dance?

every photo of every new cockpit installed in the last three years, I applauded instrument ratings gained and exams passed and I spend an entire week debating the pros and cons of aircraft ownership with those who do and those who don't.

To top things off, a colleague of mine stayed the week with me in my house in Brunswick and we traveled to the show together. This facilitated a series of aviation stories and what-ifs, and "if money were no object, what would you buy?" conversations that started at breakfast and finished at dinner. And, on the Sunday, our boss took the entire team out for dinner, and we were still talking about aviation (turns out I'm one of the few on the team who hasn't had an engine failure – gulp!).

It was only after a full week, I finally reached aviation-saturation point. Or so I thought. On my drive to the airport to head back to Sydney on Monday morning, the Uber went past Essendon, and I still turned my head to look at the aircraft on the tarmac and I still got excited by the business jets.

Upon my return home, I received an email from a reader of this column, who had just purchased a Bonanza (about which I am incredibly envious). In reaction to my comment that one has to be very determined in order to fly, he attested that one simply has to find their reason for wanting to fly. This made me stop and think, long and hard.

A reason to fly?

I thought about everyone I know who does have a reason to fly: those who own aircraft and need to justify their purchases by flying regularly, those who fly for work, those who fly aerobatics for the fun and precision; those who glide for the skill, those weekend warriors who visit a different town every month.

What was my reason?

I don't own an aircraft (yet. Damn this seller's market!). I no longer fly for work. I suck at aerobatics. And then it dawned on me: it's the people, the community.

It was an"Ah-ha!"moment. Immediately, I knew what I had to do. Two things: engage with my new flying school, regardless of the weather, which means going out there even if I can't fly. And, join an air safari.

I can't believe I hadn't thought of it before. I haven't flown in nearly two years, I love to travel and I enjoy sharing flying experiences with others. What better way to refresh one's flying skills, in the safety of a convoy, with someone to chat to about common experiences along the way?

Having found my reason, all I have to do now is find a safari. As I'm new to Victoria, I'd appreciate your input: if you know of a school or group planning a fly away later this year, please let me know on girl.with.a.stick@gmail.com.

It's been nearly a decade since I've joined a fly away and I can't believe it hasn't occurred to me that a group jaunt would be the most perfect way to get back in the av-saddle. So, reader from Bunbury – thank you!

And to everyone I met at Avalon: thank you, too. Fabulous to see you all, as a reminder of what a tremendous privilege it is to belong to the wonderfully diverse and interesting group that is general aviation.

STEVE HITCHEN

Minister Catherine King talks with industry representative at Avalon 2023.

White Paper Plans

Minister for Infrastructure, Transport, Regional Development and Local Government, and Federal Member for Ballarat, **Catherine King MP***, provides a briefing on the government's plans for an Aviation White Paper.*

The economic, social and environmental benefits of general aviation, particularly for rural, regional and remote Australia, cannot be understated.

You keep communities connected to each other and to essential goods and services. You support regional jobs and industries like agriculture, resources and tourism. You provide lifesaving services, like fire and flood relief and medical evacuation, and you promote environmental and cultural protection through aerial survey and land management.

General aviation is a key part of our aviation ecosystem and its contribution, just like the breadth of stakeholders, is vast. We know there are at least 11,000 fixed and rotary wing aircraft capable of being used for general aviation. It is critical that we capture these perspectives in the new Aviation White Paper.

It has been more than a decade since the last White Paper was released by Prime Minister Anthony Albanese, who, at the time, was the Transport Minister. The 2009 paper charted a way forward for the nation's aviation industry against the backdrop of the Global Financial Crisis.

Fast forward to today, and we are emerging from another crisis, one that has had a far greater impact on aviation and one that necessitates new policy direction. The COVID-19 pandemic disrupted aviation worldwide. The financial viability of passenger airlines nose-dived and more than 10,000 Australians lost their jobs. Meanwhile, demand for air cargo and freight services soared. The pandemic underscored the importance of a reliable, robust aviation industry and the interconnected nature of the services and supply chains it supports.

As we emerge from the pandemic, we need to reimagine the future of aviation. The new Aviation White Paper will set out a vision looking towards 2050 and a roadmap, or runway, to get there. It will consider the policy and economic reforms needed to promote efficiency, safety, sustainability and competitiveness. General aviation is one of the priority areas to be considered in the White Paper process to ensure that we get the policy settings right.

> **« General aviation is one of the priority areas »**

We want to support innovation and foster a world-class regulatory environment that is easy to navigate and is cost effective. We want to see positive engagement between regulators and industry. We want to create the skilled workforce of tomorrow through effective training pathways for pilots, maintenance and support workers. We want to provide world-class airport infrastructure, and support the sector transition to net zero.

We also need to better understand and articulate the economic value of general aviation. Prior to the pandemic, Australia's aviation industry, as a whole, employed 90,000 people and contributed $20 billion to the economy. The Bureau of Infrastructure and Transport Research Economics is conducting a study into the value of general aviation specifically, to provide the insight we need.

It is important to state that the Aviation White Paper process is not duplicating other reviews already planned or underway; these are complementary. But we can't unlock the future potential without your input. We have released the Terms of Reference (ToR) to guide the process and I encourage everyone to have their say. What are your priorities and ideas? What are the challenges and the opportunities? When we ask the right questions, we can attain the answers?

Submissions about any aspect of the ToR as well as roundtable discussions will inform the Green Paper. My department will soon release details of these roundtables commencing in March. Following the release of the Green Paper in mid-2023, we will continue to consult widely as we finalise the White Paper.

General aviation supports regional jobs and growth and connects us to vital services. As Federal Member for Ballarat, I know, first-hand, how important this sector is for regional, rural and remote Australia. You solve problems of geographic distance and you provide specialist solutions for many industries. Now is the time to look ahead and have your say on a bright future.

The sky's the limit.

For more information visit: www.infrastructure.gov.au/infrastructure-transport-vehicles/aviation/aviation-white-paper and email us aviationwhitepaper@infrastructure.gov.au

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